A Different Story about Indexicals

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Abstract

The received view about indexicals holds that they are directly referential expressions, and that the semantic contribution of an indexical consists of that thing or individual to which the indexical refers in the context of its utterance. The aim of this paper is to put forward a different picture. I argue that direct reference and indexicality are distinct and separate phenomena, even if they co-occur often. Still, it is the speaker who directly refers to the things that she is talking about, and those things matter for the truth of her utterance. Indexicals, on the other hand, merely help the interpreter identify the speaker's intended reference. Typically, indexicals encode descriptive conditions that the context must meet to make the utterance true. For example, the demonstrative 'this' encodes the condition that the subject matter, ie that about which one is talking, should be salient and proximal to the speaker. The semantic contribution of an indexical, I suggest, consists precisely of such descriptive conditions. I will offer a formal account, dubbed *contextual update semantics*, and show how it captures the main conceptual motivations and how it handles embedded indexicals, which may seem problematic at a first glance.

Organization

Section 1 provides basic motivations for the semantics of indexicals offered in this paper. Communication widely involves direct reference, and often, where indexicals are used direct reference has been made, and vice versa. However, the two phenomena should not be confused. Indexicals have descriptive meanings, which capture speakers' lexical knowledge and do not vary across contexts, and this descriptive material has important semantic and cognitive roles. Reference, on the other hand, is something that the speaker does. Typically, the speaker will directly refer to that about which she is going to say something, and will use the indexical only to help her audience figure out what it is to which she is referring directly. Section 2 outlines the general idea of the semantics proposed. On the one hand, modal, epistemic, temporal and similar operators shift the context, leading the interpreter to interpret the embedded clause as if it were uttered in the modified context. On the other hand, indexicals work as *tests* that guide you in resolving your uncertainties about the context; in particular, they guide you in determining what it is that the speaker is talking about. In other words, to interpret the indexical is to make sure that the descriptive material lexically associated with it applies to that to which the speaker is referring (in a given context). The interpretation of the indexical thus narrows down the interpreter's epistemic alternatives to those situations in which the speaker is referring to something that meets the descriptive conditions encoded in the indexical. The account is *dynamic*: the meaning of an expression is reflected in the way in which uttering and interpreting the expression changes the context. The formal semantics is given in section 3, and applied to some simple cases in section 4. Section 5 shows how the formal account works in the case of embedded indexicals, on the example of demonstrative 'this' used in reporting another person's beliefs. Section 6 points out the main problem for any account that takes the semantic contribution of indexicals to be descriptive, the way mine does. Roughly, the problem is to account for the behavior of indexicals used in modal, epistemic and temporal constructions. My way out of the problem is to say that indexicals like to be given wide scope, in the sense of being interpreted prior to shifting the context. The idea that indexicals “take wide scope” has received severe, and some even think knock-down, criticisms. Still, it is this old idea that I want to rehabilitate in the present paper. I will make it rest against a plausible, albeit rough account of how indexicals actually work, and explain why those criticisms are not convincing. Finally, in section 7, I will consider a few examples that suggest that indexicals do not *always* takes wide scope, and show how my account accommodates these cases of “shifted” indexicals.

Foreword

At the outset, let me forestall a possible misunderstanding about the motivations and goals of this paper. As indicated, I am going to put forward an account of indexicals, set within an account of a larger fragment of English (or any other sufficiently similar language), which also includes some simple modal, doxastic and temporal expressions. The account will take the form of a dynamic propositional semantics based on context-shifting. Now, in this whole endeavor, that is, in the course of providing the conceptual motivations as well as the more formal implementation, I may often seem to be doing everything "from scratch". This is because, for the smoothness and clarity of exposition, I will not bother to trace all the motivations and ideas put at work here to the insights that people working on the same or related topics had previously made. Let me therefore emphasize from the start that this work has been inspired and influenced by the work of many philosophers and semanticists, even if I sometimes fail to credit them for their insights. Just to mention some of the most obvious influences, the idea of information as update of the context and elimination of one's doxastic alternatives is taken from Stalnaker, and to some extend from Lewis, while its formal implementation is inspired by several more recent "dynamic" frameworks (in particular, that of Groenendijk, Stokhof and Veltman, and on the other hand, the dynamic-epistemic logic, to which I was introduced by Johan van Benthem). John Perry's influence is reflected in the consideration of cognitive significance carried by the descriptive material associated with indexicals, as well as on what I consider below to be the paradigm of direct reference, namely reference that is not mediated by linguistic expressions, which is related to Perry's notion of "unarticulated constituent". At the same time, to avoid confusion, let me stress that Stalnaker, Perry and others that have influenced this work all endorse, in some form or another, the received doctrine about indexicals, in that they hold that, at least in the normal case, indexicals contribute their reference, and nothing but their reference, to the semantic content. Finally, some might still think, "OK – she is not doing everything from scratch, and admittedly some of the motivations and ideas that she is deploying in her account of indexicals have been successfully developed and argued for by other people, – so what? Who needs a new account of indexicals?" In reply, I could say that in order to argue that my account fares better than other accounts on this or that score, I must place it on the market first. But there is more to my enterprise. The received view, inherited from Kripke and Kaplan, does not just hold that accounts that treat indexicals as referential expressions are generally better. It also holds that those are the only viable accounts. Viewed in this light, one of the central aims of my paper is to take up this challenge and provide an account that stands up to our intuitive desiderata about indexicals, yet construes their semantic contribution solely in terms of the descriptive conditions encoded in their lexical meaning.

§ 1. Introduction: the Referentialist and the Descriptivist Intuitions

§1.1. The referentialist intuition

In order to communicate successfully, we ought to be able to convey information *about* people and things around us. That is because information gained through communication can motivate actions that bear upon particulars. But in order to convey information about a particular thing, one first needs to refer to it. When the thing is there, at hand, when it belongs to the situation of utterance and is perceptually available to the speaker and her audience, it is usually possible to refer to it *directly*. Here is an example of what I take to be a paradigmatic case of direct reference. Suppose that we are staring at some portrait on the wall, and that I simply say:

(1) Impressive!

Then I will be referring to the portrait directly, and I will be saying of it that it is impressive.

Similarly, suppose that we are on the Main Quad at Stanford, it starts raining, and you say:

(2) It is raining.

The place where you say that it is raining, the Main Quad at Stanford, has been referred to directly.[1] The point is that neither of us had to employ any expression for the thing and the place that we were talking about, let alone find some descriptive way of identifying them. It is this form of reference, reference that enables you to talk about a particular thing even though you do not need to use any expression for it, that I take to be direct *par excellence*. Reference supported by words, be they indexicals, proper names, or definite descriptions, is merely parasitic on that other, more basic form of reference – or so I will argue.[2]

[1] Cases of this kind were brought to attention by Perry (86). Perry would say the place referred to in your utterance of (2) is an "unarticulated constituent" of the proposition that you expressed. As it will become clear soon, the term of unarticulated constituent is rather unfortunate to my sense. A constituent is, by definition, constitutive of something, but in the framework that I am putting forward, the place referred to in (2) does not act as a constituent of anything.

[2] In what follows, my use of the generic term 'indexical' will cover demonstrative pronouns as well as what some people (eg Kaplan) call "pure" indexicals, which are supposed to uniquely determine their reference in any given context (examples are 'I', 'today', possibly 'now' and 'here'). I am not trying to abolish this distinction, although it fades away in the semantics that I offer both for demonstratives and for "pure" indexicals.

Turning more closely to indexicals now, at a first glance, they might seem to be expressions that merely stand for the things or individuals referred to and talked about, without doing any other job. Consider:

(3) **This** is impressive!

(4) It is raining **here**.

These appear to be equivalent ways of saying what was said in (1) and (2), perhaps a little bit more "articulated." It is widely held that indexicals, like 'this' and 'here', are devices of direct reference. On that dominant, Kaplanian view, the only thing that an indexical contributes to the semantic content of an utterance is the very thing that the utterance is about, as is the portrait in the case of (3), or the Main Quad in the case of (4).[3]

This referentialist intuition is often cashed out using the idea of a variable to which a value has been assigned.[4] If (1) and (3) are uttered in reference to the portrait on the wall, say *Mona Lisa*, and if P stands for the predicate of being impressive, then, setting tense aside, it has been suggested to formally represent (1) and (3) with $Px[x \rightarrow ML]$, that is to say, with open sentence 'Px' and the indication, expressed in the metalanguage, that the variable x receives *Mona Lisa* as its value. But what is the explanatory force of this rendering? I am not sure that there is any. However, Kaplan takes it for granted that a formula with a variable to which a value has been assigned is equivalent to a proposition that somehow includes that value among its constituents. Understood that way, (1), and for Kaplan (3) as well, would express the proposition *that ML is impressive*. But it is clear that (1) may equally well be seen as simply expressing the predicate of being impressive, and this predicate is *evaluated* at an object – here, at *Mona Lisa*. In other words, to represent an utterance with $\varphi x_1...x_n[x_1 \rightarrow a_1,..., x_n \rightarrow a_n]$ would mean that the utterer expresses open sentence $\varphi x_1...x_n$, and that this sentence is to be evaluated at the values assigned to the variables, viz. $a_1,..., a_n$.

[3] This referentialist view is very widespread. It has been held by Kripke (80), Kaplan (77), Recanati (93), Soames (02), to mention only a few. It is worth noting that although this view is often called neo-Russellian, Russell held quite a different view. For him, as well as for Reichenbach, 'here' was just a shorthand for something like "the place where this token of 'here' is occurring," where only 'this token' was referential. See Russell (45) & Reichenbach (47).

[4] Cf. Kaplan: "The paradigm of direct reference is a variable under an assignment of value" (89, p.537).

Referentialism about indexicals combines two intuitions. One is that we use indexicals to refer to the things about which we want to say something, and the other is that the semantic job of indexicals is merely to refer. My own proposal preserves the first intuition to a certain extent, and discards the second. Natural language semantics needs to accommodate direct reference, as illustrated by cases (1) and (2); that will be one of my two main motivations. I also agree that often, a speaker who is using an indexical has directly referred to something or someone, about which or whom she is saying something. How often this happens depends on how indexical the expression is. Indexicality, in other words, comes in degrees. We scarcely, if ever, use words 'I' and 'here' to talk about a person or a place not immediately accessible in the context of utterance. On the other hand, 3rd person pronouns, demonstratives and definite descriptions can be more easily used to talk about people and things unavailable in the context of utterance, people and things to which our access is mediated by some more or less specified conditions.

To illustrate the contrast, consider the sentence 'He looks weird'. If there is a man in front of us, I can use this sentence to say of that man that he looks weird. But I can also use it in a context where there is no male individual around. All that I need to do is to secure access to some context in which 'he' becomes felicitous. For instance, I might begin by saying “Someone is sitting in the lounge.” This takes us to a hypothetical context in which there is a person sitting in the lounge. One may then interpret 'he looks weird' in that context, with the pronoun 'he' now enabling me to say of the guy in the lounge that he looks weird.[5]

When direct reference is accompanied by the use of an indexical, we are tempted to say that the speaker uses the indexical in order to refer to the thing at stake. But it seems more appropriate to say that she uses the indexical in order to help her audience figure out what it is to which she is referring. In other words, you do not need indexicals in order to refer to particular things, but you might still need them in order to make it clear to the others what it is to which you are referring.[6]

[5] As the example suggests, in the background, there is an aim to offer a unified account of deictic and anaphoric uses of pronouns and similar devices. The prospect of such a unified account has often been one of the driving motivations of dynamic semantics. (See eg Heim (88), Kamp & Reyle (93), or Dekker (03), whose account is, strictly speaking, not dynamic. Note, however, that pronouns and anaphora in general pose many additional problems, with which this paper is not concerned at all.

[6] John Perry has urged me to clarify this subtle point.

Moreover, even when it is obvious what you are referring to, there may be reasons pertaining to grammar or style to use a noun phrase. When used for such reasons, the noun phrase becomes semantically redundant, so to speak.

§1.2. The descriptivist intuition

My second main motivation is "descriptivist." It is possible to associate with any given indexical a certain kind of descriptive meaning, which does not vary with the context. This meaning is what competent speakers know, what dictionaries try to provide, and what helps dispelling confusions regarding the question of what the speaker is talking about. For example, the meaning of 'this' encodes the information that the thing talked about is salient and proximal to the speaker, while the meaning of 'here' bids the interpreter to look for a location at which an utterance of the word 'here' has taken place. When I utter (3) in reference to the portrait, the lexical knowledge that you associate with the word 'this' will assist you in identifying Da Vinci's *Mona Lisa* as my intended reference, since the description encoded in the meaning of the demonstrative applies uniquely to that portrait in the context in which I uttered (3).

Let me make it clear from the outset that I am *not* suggesting that for every indexical, there is some unique description that entirely captures its meaning. What the descriptive meaning of an indexical amounts to is underspecified by the account that I am offering, the same way as is the question of what are the lexical meanings of common nouns like 'dog' or 'pencil' or verbs like 'run' or 'cut'.

The descriptive material carried by the meaning of an indexical is often of major cognitive significance. It makes the utterance informative, or at least, supplies information over and above that primarily conveyed by the utterance. It also guides actions that are partly motivated by one's assent to the utterance. For example, if I go to see the doctor and I tell him, "I am injured," he can go on and help *me*, having identified me as the person who has just told him that she is injured. But if I tell the doctor instead, "Isidora Stojanovic is injured," he will first try to find out who that person is, and inquire whether she needs an ambulance to be sent for her. At any rate, if I use my

own name instead of the 1st person pronoun, my interlocutor may fail to act directly upon me, even though he has been told something that turns out to be about me. In the case of 'I', my interlocutor's action is based on the information that the person talking to him is injured, while in the case of a proper name, it is based on the information that the bearer of that name is injured. Different pieces of information, albeit about the same person, are displayed depending on which expressions have been used, and that may give rise to different actions.[7]

While referentialism holds that this sort of descriptive information does not reach into the semantic content of the utterance, I hold that what indexicals contribute to the content are precisely such descriptive conditions.[8] If you find the analogy with variable assignments helpful, then here is the gist of my proposal. While the semantic content of (1) may be formally represented with $Px[x \rightarrow ML]$, with $[x \rightarrow ML]$ indicating that we evaluate that content at *Mona Lisa*, the semantic content of (3) may be represented with $P_{this}x \wedge Px[x \rightarrow ML]$, where P_{this} is a predicate satisfied in a context by anything that is salient and proximal to the speaker in that context, and where $[x \rightarrow ML]$ similarly indicates that both conjuncts are to be evaluated at *Mona Lisa*. Some qualifications will be made to this proposal, but the idea is, roughly, that both P and P_{this} are genuine predicates, and that they are both asserted of the portrait of *Mona Lisa*, although we normally assert them for different purposes. We assert P because we want to communicate information about ML, to the effect that it is P, and we assert P_{this} because we consider it to be common knowledge among our interlocutors that ML is P_{this}, and in that way, we let ML stand out as something of which we are going to say more, namely, to assert P.

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[7] As many will recognize, the above is an instance of the problem of the essential indexical, discussed by Perry (93) and many others. There are two lessons to be drawn from that problem. One is that the descriptive material associated with indexicals is not cognitively inert. The other is that in order to explain how action motivated by our beliefs and desires may bear upon the world around us, we need direct reference. In other words, as I argued in Stojanovic (01), what has come to be known as *the* problem of the essential indexical actually consists of two different and arguably independent problems. Note that those problems correspond precisely to the two motivations that I have laid out.

[8] Admittedly, the notion of semantic content is somewhat obscure, but I intend to be using the way it is used in the literature (Kaplan (77), Recanati (93), Perry (93), (01), Soames (02) etc.). Semantic content is, roughly, the set of conditions that tell you what must be the case for the utterance, as made in a given context, to be expressing a truth. As will become clear, I reject the distinction between linguistic meaning (which Kaplan tried to capture with his notion of character) and semantic content. This is not to eliminate the notion of content altogether, but it is to reduce it to the notion of meaning.

§ 2. The General Idea: Context-Shifts and Updates

§2.1. How operators "shift" the context

The framework that I will offer is meant to capture an idea well-known in dynamic semantics. It is the idea that sentential operators, which, in natural language, correspond to constructions that introduce subordinate clauses, like 'it is possible that' or 'once it was the case that' or 'most people think that', *shift the context*. Syntactically, sentential operators form sentences out of sentences. Semantically, they map sentence values to sentence values. In the forthcoming framework, the semantic value of a sentence, relative to a structure of interpretation, will correspond to a set of contexts. Intuitively, it is the set of all those contexts in which the sentence, if uttered, is uttered truly.

If O is an operator, translating a construction like 'it used to be the case that' or 'Ali thinks that,' its semantics will follow this pattern:

> Oψ is true in context c if and only if ψ is true in DET context(s) c* such that Rcc*, where DET is a determiner (such as 'every', 'some', 'most', etc.) and R is a relation among contexts.

For instance, sentence ⌜Ali thinks that ψ⌝ will be true in context c if and only if sentence ψ is true in every context c* that belongs among Ali's doxastic alternatives for c.[9] Roughly, everything true in c* is compatible with what Ali believes to be true, while there may be things true in c that Ali thinks are actually false. In other words, c* is what you would get if you made c fit Ali's picture of the world.[10]

[9] This is, by the way, in line with the standard Hintikka-style semantics for propositional attitudes.

[10] More properly, c* is only one of the contexts that you would get if you were to adjust c to Ali's picture of the world. Here is why. We are assuming that contexts provide a *complete* account of the state of affairs. They give us a list, so to speak, of all the things that are true, and those that are not on the list are ipso facto false. Now, there may be many things on which Ali has formed no belief. For instance, Ali may neither believe that São Paulo has cable cars nor believe that São Paulo does not have cable cars. Ali simply has no view on that issue. This means that, whatever c may look like and whether or not São Paulo has cable cars in it, c will allow for (at least) two doxastic alternatives for

This idea that sentential operators shift the context, or something very much like it, already lied behind the enterprise of modal, temporal and epistemic logics. Consider the modalities ◊ and □, with their usual semantics: ◊ϕ is true in state s_1 iff there is a state s_2 which can be accessed from s_1 and in which ϕ is true; and □ϕ is true in state s_1 iff ϕ is true in every state s_2 accessible from s_1. Slightly modifying this old idea, I propose to view such operators as shifting the *context*, rather than the *state*. The modification may seem terminological at first, but more substantial changes will appear after the framework has been laid down in full. At any rate, let me set aside the general question or what contexts are, and merely say a word on how they will be used in the formal framework. I start by giving myself the notion of *situation*. I take situations for primitives, in the same way in which possible worlds are taken for primitives in Kripkean semantics for propositional modal logic. This does not mean that situations have no structure, but whatever their structure may be, it is definitely not presupposed by my framework.[11] However, some of that structure can be read off from the *relations* that situations bear to one another. Those relations, too, I take for primitives.[12] For example, one situation may occur before another one. When two situations are in the relation of temporal order, you might think that this is because their structure has a temporal coordinate that stands for the time when the situation takes place. But, as I said, I am not assuming that situations have any temporal or other coordinates, only that they can bear to one another various temporal or other relations. And those relations are deployed in interpreting sentential operators: temporal relations are used in interpreting temporal operators ('it was once the case that,' tenses, etc.), epistemic relations, such as epistemic indistinguishability, are used in interpreting epistemic operators (knowledge reports, etc.), and so on.

At first sight, it is tempting to propose a semantics that goes something like this:

Ali, one in which São Paulo has cable cars and one in which it does not. And it is easy to see how quickly doxastic alternatives multiply for ordinary agents like Ali and most of us.

[11] When it comes to the questions of what situations are like, the locus classicus is Barwise and Perry (83). Even though my account is largely driven by motivations similar to those that drove Barwise and Perry in their pioneering work, I suspect that my formal framework bears little resemblance to the situation theory as we know it today.

[12] To be sure, from a set-theoretic point of view, any such binary relation can be identified with a set of situation-pairs, relative to a structure of interpretation. When I say that those relations are considered as primitives, I mean that in principle, you cannot determine whether or not two situations are in a given relation just by looking at the situations themselves.

pastϕ is true in situation s_1 iff $\exists s_2$ $s_2<s_1$ and ϕ is true in s_2;

A knows that ϕ is true in situation s_1 iff $\forall s_2$ if $s_1 \sim_A s_2$ then ϕ is true in s_2; etc.

However, I am not going to build up semantics along those lines, and the reason is that I am not taking truth to be relative to situations, but rather to *contexts*. To be sure, the truth of *atomic* sentences (those that correspond to simple sentences such as 'delicious') is primarily relative to situations. But the truth of more complex sentences, which involve relations between situations, relations which cannot be derived from within a situation, needs to be relative to something that supplies information on those relations. That is what contexts do, in the present framework. I will understand by "context" a complex entity that consists of: (1) a set of situations S; (2) a bunch of relations on S; (3) a valuation, which maps every propositional atom to some set of situations (those in which the atom is true); (4) a designated situation (on which we will say that the context is "centered"). In other words, a context is exactly like a entire Kripkean structure, with a very large array of accessibility relations, and in which "situations" play the role of possible worlds.[13]

Given any relation among situations, there is a straightforward way to define a corresponding relation among contexts. Consider some relation on situations, such as temporal precedence. Then we may say that contexts c and c* are in the corresponding relation (viz. that context c takes place before c*) iff their designated situations, s_c and s_{c*}, are in the given relation of c, and if the two contexts are the same in every other respect.

With this in mind, it becomes more clear what we mean when we say that operators like 'it is necessary that', 'it has been the case that', or 'Ali thinks that', *shift the context*. Suppose that in

[13] The contrast that I have just drawn between "situations" and "contexts" is nothing but the old contrast, familiar to any modal logician, between possible worlds and models (that is, structures with their designated world). My point is to let the less logically oriented readers be aware of the contrast, while at the same time phrasing it in the terminology adopted in this paper. And the reason for adopting new terminology is that it may help in understanding how this old machinery of modal logic is applied to the conceptual framework that I am offering, in which to interpret a sentential operator is to project oneself to a different, possibly hypothetical context, suitably related to the original context of interpretation, and interpret the embedded sentence in that "shifted" context. Now, one might object that there is little point to insist that those operators shift the context and *not the situation*, since, so long as one keeps track of the background structure, one will know how this situation relates to other situations, which is all that one needs to interpret the sentence containing the operator. I accept the objection, with two provisos: first, it presupposes the point that I was making, namely, that in evaluating a sentence with an operator, you need to know how the situation relates to other situations, and that, you cannot find out "from within" the situation; and second, as we shall presently see, if we want to approach the interpretation of indexicals dynamically, as a process that involves context change, then the situation of interpretation does not really shift – rather, the modification bears on the background structure itself.

context c, you are interpreting sentence S that consists of an operator O embedding sentence S_0. For instance, imagine that on February 2, 2005 we are in Stanford and I tell you "Ali thinks that it is raining." Then by interpreting the doxastic operator, you are driven to interpret the embedded sentence in some context c* to which c bears the relation deployed by the operator. That is, you are driven to select among Ali's doxastic alternatives for that context located in Stanford on 11/2, and it is in the context centered on this doxastic alternative that you will interpret 'it is raining'.[14]

§2.2. How indexicals "update" the context

Probably the main point that I am trying to make in this paper is that indexicals are *descriptive* insofar as their semantics is concerned. In this respect, indexicals are not different from definite descriptions. They describe things, and by doing so, they help the speaker's audience to figure out what she is talking about and conveying information about.

However, let me emphasize that in this descriptivist approach, reference is still a crucial element in the big picture. In general, in order to get to the truth value of a sentence containing an indexical, we will need to identify the thing to which reference has been, and to look at the facts that hold of that particular thing. But while reference is relevant to truth, and therefore, some would say, semantically relevant, I am suggesting that the thing referred to is not contributed to any level of semantic content, and more importantly, it is *not* what the indexical contributes. Rather, the semantic contribution of an indexical consists of the descriptive conditions lexically encoded in its meaning.

The descriptive meaning of an indexical may be also seen as a way of grouping together all those contexts in which the indexical may be used to say something true. What all true utterances of, for example, the sentence 'I am injured' have in common is that they are made in contexts in which someone is using the word 'I' and is injured. Viewed this way, the meaning of an indexical corresponds to a condition on contexts (or, if you wish, to a property of contexts).

[14] To anticipate an important point, I am not suggesting that shifts are always functional. Often, there will be many contexts c* to which you may shift from c along the relation deployed by the operator. How it all works will be explained after the technicalities have been laid out.

This descriptivist motivation largely stems from examining how indexicals actually work. Suppose that Bharati now says:

(1) I am injured.

By using the 1st person pronoun, Bharati describes someone as a speaker, or as being someone who has just used the word 'I'. As it turns out, in the situation in which (1) is uttered, the description applies only to her. Bharati will typically assume that her audience knows this. The task of the indexical 'I' in (1) is to guide Bharati's audience in figuring out that Bharati is talking of herself, and saying of herself that she is injured.

Someone interpreting (1) who knows that among the potentially relevant contexts, only those that are about Bharati are to be counted as 'I'-contexts, will therefore consider as inaccurate every context centered on a situation in which someone other than Bharati is the subject matter. In other words, only those contexts in which Bharati is being spoken about remain active after an update with the indexical 'I'.

The way in which indexicals update the context is, then, the standard kind of update, not very different from what we find eg in Stalnaker's pioneering work.[15] To update the context in this way is to "eliminate" all the situations that fail to meet the descriptive conditions at stake. While this notion of update is old and well-known as applied in theories of communication (specifically, to account for the informational impact of assertion), I am not aware that it has ever been applied in this straightforward way to indexicals or any other noun phrases.

To sum up, the way in which indexicals update the context is by narrowing down the set of candidate situations, eliminating all those that fail to meet the descriptive conditions associated with the indexical. Thus, to put the idea in slightly different terms, the indexical 'I' *tests* every

[15] Cf. Stalnaker (78) and, more generally, Stalnaker (99). Roughly, the original idea is that to interpret and assent to an utterance *u* is to narrow down your "information set" to only those possible worlds in which the proposition expressed by *u* is true. The information set of an agent consists of worlds that are epistemically indistinguishable for her, that is to say, any of those worlds could, for all she knows, turn out to be the actual one. It goes without saying that the idea of "eliminating" the worlds incompatible with the information received is only a way of modeling information, and a useful metaphor. My suggestion that when you interpret an indexical, you are eliminating from the set of contexts indistinguishable for you all those contexts that are incompatible with the descriptive conditions encoded in the indexical should similarly be seen as a way of modeling what happens in the interpretation of discourse that contains indexicals.

"candidate" situation for speakerhood, and eliminates all the situations that fail the test, and similarly for other indexicals.[16] On the other hand, the way in which sentential operators update the context is by shifting the interpretation of the discourse to a context centered on some other situation.

In either case, updates may be seen as relations between contexts. Tests are updates, and moreover, they are functional updates: after eliminating every situation that fails the test, one is left with some unique set of situations. This means that, given a context, there is at most one context related to it by a test-like update relation. Shifts are also updates, but they are usually not functional. For instance, when you shift along the temporal dimension in virtue of interpreting the phrase 'at some later time', any shift is fine so long as it obtains between contexts whose only difference is that they are centered on situations that have taken place one before the other.

Now, you might wonder how it is possible to go on interpreting a discourse after such a non-functional update of the context. The problem is that, on the one hand, there are several contexts to which the interpreter may shift equally well, because they are all related to the initial context by the relation deployed in the update, but on the other hand, our intuition is that the process of interpretation will continue in a single context (as opposed, say, to the idea of parallel processing in all of the accessible contexts). And if we suppose that even after a non-functional update, the interpretation resumes in some particular context, how does that context get selected? Why would I interpret the embedded sentence in one context rather than another, if both contexts are equally well accessible?

These are important questions, and to answer them, we need to appeal to some more general pragmatic principles. I will return to the issue only after I have laid down the basic features of my semantic account.

[16] Situation s is a "candidate" if, for all that you know, it might be the case that s is the actual situation. Now, Johan van Benthem has been pointed out to me a tension in the terminology that I am using and that may lead to confusion; namely, the term 'test' is used in dynamic semantics precisely for operators that do *not* change the context. This seems prima facie inconsistent with my simultaneous proposal that indexicals *update* the context. To make things clear, my proposal is not that indexicals *shift* the context, so in *this* sense, indexicals do not change the context. The sense in which they change, or *update*, the context, is that they may, though need not, narrow down the set of the interpreter's epistemic alternatives as to what is the right context of interpretation. With this clarification in mind, I will continue to use the term 'test', albeit in a somewhat idiosyncratic way.

§ 3. Contextual Update Semantics

I now turn to the formal framework, hoping that the informal remarks made so far will facilitate its grasp. I lay down the framework itself in this section, and show how it works in the next two sections.[17] What I am offering here is very much a "toy" semantics, of a modest scope. Moreover, it might not even be the best framework, and is certainly not the only possible one, to account for the motivations behind the informal story that I am telling in this paper, which is what counts most.

§3.1. Syntax

This section lays down the syntax of the formal language **L**, whose semantics is given in the next section. In defining **L**, we will use atomic vocabulary **A** consisting of propositional letters, update language **U** consisting of update instructions, the usual propositional connectives, and two pairs of symbols to form dynamic modalities, **< >** and **[ ]**, which take update instructions as inputs and yield unary sentential connectives as outputs (that is to say, if α is an update instruction and ψ a sentence of **L**, then $<\alpha>\psi$ and $[\alpha]\psi$ are also sentences of **L**). Update language **U** consists of *atomic* instructions, of *tests*, made using the sentences of **L** itself, bracketed within **¿ ?**,[18] and of instructions *composed* out of other instructions using **;**. Given that language **L** uses expressions from update language **U** in forming dynamic modalities, while **U** in turn uses expressions from **L** in forming tests, we define the two languages using simultaneous induction, as expected.

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[17] The framework follows closely the "Core System" of Dynamic Logic in van Benthem (96, p.124). However, there is a one significant difference on the semantic side: in van Benthem's Core System, instructions, or "programs," are relations between situations, or "states," of the same structure, while in the present system, they will be modeled as relations between the structures themselves, with their designated situations. I am very much indebted to Johan van Benthem for discussion and useful suggestions concerning the logical aspects of the framework proposed here.

[18] In the present version, I have introduced this weird notation to forestall a confusion between what I call "tests" and the standard tests from dynamic logic. The difference shows up clearly in the definitions given below, in §3.3.1.

Def 1. (propositional atoms)

$\mathbf{A} :=_{df} \{p_1,\ldots, p_n,\ldots, q_1,\ldots, q_n,\ldots.\}$

Def 2. (atomic update instructions)

$\mathbf{U_{at}} :=_{df} \{a_1,\ldots, a_n,\ldots\}\cup\{cg\}$

The distinguished instruction *cg*, which we read "common ground", intuitively stands for the instruction to check that something is common knowledge between the speaker and her audience, and will be interpreted by an accessibility relation that holds among the situations accessible by some path of indistinguishability relations for the speaker and her audience.

Def 3. (update instructions)

Clause 1a. $\mathbf{U} \supseteq_{df} \mathbf{U_{at}}$

Clause 1b. If $\varphi\in \mathbf{L}$, then $\mathbf{¿}\varphi\mathbf{?}\in \mathbf{U}$.

Clause 1c. If $\alpha\in \mathbf{U}$ and $\beta\in \mathbf{U}$, then $\alpha;\beta\in \mathbf{U}$.

Clause 1d. **U** is the smallest language obtained through clauses 1a, 1b and 1c.

Def 4. (sentences)

Clause 2a. $\mathbf{L} \supseteq_{df} \mathbf{A}$

Clause 2b. If $\alpha\in \mathbf{U}$ and $\psi\in \mathbf{L}$, then $<\alpha>\psi\in \mathbf{L}$ and $[\alpha]\psi\in \mathbf{L}$.

Clause 2c. If $\varphi\in \mathbf{L}$ and $\psi\in \mathbf{L}$, then $\neg\psi\in \mathbf{L}$, $\varphi\wedge\psi\in \mathbf{L}$ and $\varphi\vee\psi\in \mathbf{L}$.

Clause 2d. **L** is the smallest language obtained through clauses 2a, 2b and 2c.

§3.2. Structures, contexts and situations

Def 1. Σ is a **structure** iff$_{df}$ it is of the form $\langle S, \Im, V\rangle$, where

- S is a set of situations
- for every a_j in $\mathbf{U_{at}}$, $\Im(a_j)\subseteq S\times S$
- for every p_i in **A**, $V(p_i)\subseteq S$.

Def 2. μ is a **context** iff$_{df}$ μ is of the form $\langle \Sigma, s \rangle$, where

- Σ is a structure $\langle S, \Im, V \rangle$ and $s \in S$
- we say that s is the *designated* situation of μ, and that μ is *centered* on s.

In other words, what is here called a "context" is what is usually called a "model," that is, a structure together with some designated element. Now, a structure consists of a set of situations, a set of accessibility relations on those situations, and a valuation, telling you which propositional atoms hold in which situations. Every atomic update instruction a_j, which intuitively corresponds to instructions like "move to an earlier situation" or "change the subject matter," is mapped by $\Im$ to some relation between situations, while every propositional atom p_i is mapped by V to some set of situations, namely, those in which the proposition is true.

§3.3. Semantics

Let us now turn to the semantics for **L**, which consists of truth clauses for the sentences of **L**, and is provided simultaneously with the semantics for **U**, which consists of satisfaction clauses for the instructions of **U**.

§3.3.1. Semantics for U:

For any $\alpha \in \mathbf{U}$, let $R(\alpha)$ stand for a relation between contexts, whose satisfaction conditions are defined below by induction. (We sometimes say that instruction α "holds" between two contexts, meaning that the corresponding relation $R(\alpha)$ holds between those contexts.)

Tests. $\langle \Sigma, s \rangle \, R(\text{¿}\varphi\text{?})\langle \Sigma', s' \rangle$ iff$_{df}$ $s'=s$, $S'=\{u \in S \mid \text{if } (s,u) \in \Im^{\Sigma}(cg) \text{ then } \langle \Sigma, u \rangle \models \varphi\}$,
and Σ' is the same as Σ in every other respect.[19]

$\Im(cg)$, the relation of "common ground" among situations, is defined upon indistinguishability relations, borrowed from epistemic logic. A situation belongs to the common ground either when it is one of the speaker's or the interpreter's epistemic alternatives for the actual situation, or when

[19] An alternative definition of test-satisfaction: $\langle \Sigma, s \rangle \text{¿}\varphi\text{?} \langle \Sigma', s' \rangle$ iff$_{df}$ $s'=s$ and $\Sigma'=\Sigma^{\frown}(\{t \mid \langle \Sigma, t \rangle \models \varphi\} \cup \{t \mid t \notin \Im^{\Sigma}(cg)\})$.

it is the speaker's or the interpreter's epistemic alternative for some situation that already belongs to the common ground.[20] So, a test holds between contexts μ and ν whenever μ is the same as ν except that every situation in μ's set of situations reachable from μ's designated situation via the common ground relation in which φ does not hold is eliminated from ν's set of situations.

Shifts. $\langle \Sigma, s\rangle R(a_j)\langle \Sigma', s'\rangle$ iff$_{df}$ $\Sigma'=\Sigma$ and $(s, s')\in \Im(a_j)$.

In other words, a shift holds between contexts μ and ν when their only difference is that ν's designated situation is related to μ's designated situation by the relation that interprets the update instruction in the shift.

Compositions. $\langle \Sigma, s\rangle R(\alpha;\beta)\langle \Sigma', s'\rangle$ iff$_{df}$ there is $\langle \Sigma'', s''\rangle$ such that $\langle \Sigma, s\rangle R(\alpha)\langle \Sigma'', s''\rangle$ and $\langle \Sigma'', s''\rangle R(\beta)\langle \Sigma', s'\rangle$.

In other words, a composed instruction α;β holds between contexts μ and ν when it is possible to arrive at ν from μ by executing first instruction α and then β; or equivalently, when there is an intermediate context such that α holds between μ and this context and β holds between it and ν.

§3.3.2. Semantics for L:

Def 1. $\langle \Sigma, s\rangle \models p_n$ iff$_{df}$ $s\in V^{\Sigma}(p_n)$.

Def 2. $\langle \Sigma, s\rangle \models <\alpha>\psi$ iff$_{df}$ there is $\langle \Sigma', s'\rangle$ such that $\langle \Sigma, s\rangle R(\alpha)\langle \Sigma', s'\rangle$ and $\langle \Sigma', s'\rangle \models \psi$.

Def 3. $\langle \Sigma, s\rangle \models [\alpha]\psi$ iff$_{df}$ for every $\langle \Sigma', s'\rangle$, if $\langle \Sigma, s\rangle R(\alpha)\langle \Sigma', s'\rangle$, then $\langle \Sigma', s'\rangle \models \psi$.

Def 4. $\langle \Sigma, s\rangle \models \chi\wedge\psi$ iff$_{df}$ $\langle \Sigma, \sigma\rangle \models \chi$ and $\langle \Sigma, s\rangle \models \psi$.

Def 5. $\langle \Sigma, s\rangle \models \chi\vee\psi$ iff$_{df}$ $\langle \Sigma, s\rangle \models \chi$ or $\langle \Sigma, s\rangle \models \psi$.

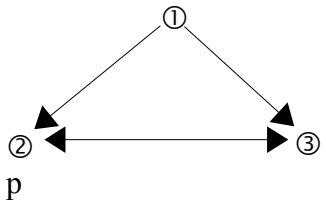
Def 6. $\langle \Sigma, s\rangle \models \neg\chi$ iff$_{df}$ $\langle \Sigma, s\rangle \not\models \chi$.

[20] In other words, a situation belongs to the common ground when it can be reached by some path that consists of the speaker's and the interpreter's indistinguishability relations, combined. Thus something is common knowledge in a given context if it holds in every situation that belongs to the common ground. To be sure, at this stage, this is only a desideratum, not yet secured by the semantics laid down so far. The need for this relation as well as the restrictive role that it plays in the definition of a test will become more clear when we get to examples.

<α> is the "existential" dynamic modality that tells us that the sentence holds (in a given context) iff it is possible to execute the update instruction i in such a way as to end up in a context in which the embedded sentence ψ holds. Analogously, the "universal" modality **[**α**]** tells us that every way that you execute instruction i will lead you to a context in which ψ holds.

For illustration, consider structure Σ defined as follows:

S={1, 2, 3}
ℑ(a)={(1, 2), (1, 3), (2, 3), (3,2)}
V(p)={2}



Sentence <a>p is true at contexts ⟨Σ, 1⟩ and ⟨Σ, 3⟩ and false at context ⟨Σ, 2⟩, and sentence **[**a**]**p is true at context ⟨Σ, 3⟩ and false at the other two.

§3.4. Translation

So far, I have given you the *mechanics*. That is, I have defined a simple system of propositional dynamic logic, by first giving its syntax, and then its semantics. In the next two sections, I will make some suggestions on how this system can be used as a formal semantics for a fragment of English that contains, in particular, modal and doxastic expressions, as well as indexicals, definite descriptions and proper names. But before looking at some concrete examples, let me make a few general suggestions on how this fragment of English is to be translated into the formal language of contextual update semantics.

Consider first the usual doxastic and epistemic expressions, such as 'Bharati thinks that' or 'Ali knows that'. To translate them, we need to distinguish in **U** (the language of update instructions) appropriate elements $a_{Bharati}$ and a_{Ali}, which will be interpreted by Bharati's and Ali's relations of doxastic alternative and can be read, roughly, as the instruction to adjust the present situation to Bharati's or Ali's picture of the world, to put it picturesquely. We also need elements $\sim_{Bharati}$ and $\sim_{Ali}$, which will be interpreted by Bharati's and Ali's epistemic indistinguishability relations. Once we have those elements in **U**, the phrase 'Bharati thinks that' will be translated by the dynamic

modality $[a_{Bharati}]$, and 'Ali knows that', by $[\sim_{Ali}]$. So, the suggested translations are exactly the usual ones adopted in doxastic and epistemic logic, only "dynamified."

Somewhat more original is the suggestion to translate a large class of English words directly into propositional atoms. Thus, for verbs, both intransitive and transitive, like 'rain', 'run', 'love', 'give', etc., we will have in **A** (the atomic language), propositional atoms p_{rain}, p_{run}, p_{love}, p_{give}, etc. For adjectives, like 'impressive' or 'fun', and for nouns, like 'dog' or 'nun', we will have p_{imp}, p_{fun}, p_{dog}, p_{nun}. For indexicals, like 'this', 'here' or 'you', we will have distinguished propositional atoms p_{this}, p_{here}, p_{you}, etc. Finally, for proper names, like 'Ali' or 'Paris', we will have atoms p_{Ali}, p_{Paris}, etc.

Since the proposal is far from obvious, let us immediately look at the semantic side and try to provide some intuitive underpinning to the truth conditions associated with propositional atoms. For example, if p_{rain} translates 'it rains', then $V(p_{rain})$ will be the set of all those and only those situations in which it rains. If p_{imp} translates 'impressive', then $V(p_{imp})$ will be the set of all those situations whose subject matter is impressive. If p_{love} translates 'loves', then $V(p_{love})$ will be the set of all those situations in which the agent loves the patient.[21] If p_{dog} translates 'dog', then $V(p_{dog})$ will be the set of all those situations whose subject matter is a dog. If p_{this} translates 'this', then $\Im_P(p_{this})$ will be, roughly, the set of all those situations whose subject matter is salient, perceptually available and proximal to the speaker. If p_{Ali} translates 'Ali' (the proper name), then $V(p_{Ali})$ will be the set of all those situations whose subject matter is someone called 'Ali'. And so on.

Note that we have completely given up on the analogy between direct reference and variables under assignments. The semantics that I am proposing is a variable-free framework. Not only are atomic sentences such as 'it rains' translated by propositional atoms, but linguistic items that are normally translated by predicates (taking one or more arguments), such as common nouns,

[21] In the case of relational predicates, which correspond to transitive verbs such as 'love' (2-place) or 'give' (3-place), it is not clear whether one would want to say that the agent is the subject matter, or whether the subject matter is something more complex, involving both the agent, the patient and possibly some other thematic roles. Consider, for example, "Ali gave Bharati a hug." This utterance is intuitively about Ali, but in a sense, it is also about Bharati and about the hug that Ali gave her, and about the event of Ali giving Bharati a hug. So one might ask, which of all these candidates is *the* subject matter of the situation with respect to which we are to evaluate the atom corresponding to the verb 'give'. But this question does not have a clear answer, mainly because the notion of subject matter is heuristic, not formal, as I go on to explain below.

adjectives, or transitive and intransitive verbs, are also translated here as propositional atoms. Such an atom, say for 'smart', will not receive as its semantic value some set of individuals (all those who are smart), the way it usually works in formal semantics built on first order logic. Instead, its semantic value will be some set of situations, viz. all those whose subject matter is smart.

It is important to note that while the *word* 'this' gets translated by propositional atom p_{this} , the *noun phrase* 'this', as used in a sentence like 'This is burning', will be translated by the dynamic modality $<¿p_{this}?>$, the whole sentence getting translated by $<¿p_{this}?>p_{burning}$. When 'this' occurs as a 1-place determiner, as in 'This potato is burning', the translation will be $<¿p_{this}?;¿p_{potato}?>p_{burning}$.

The semantic clauses for the dynamic modalities make it clear that universal and existential quantification lie beneath. In turn, it is tempting to use the two modalities to account for ordinary quantifiers. The case is relatively simple with *monadic* quantification. For example, consider the sentence 'Something is burning'. Its translation in **L** would go something like $<a_{subj}>p_{burning}$. Here, instruction a_{subj} tells you, roughly, to change the subject matter. The sentence will be true, then, if you can shift to a situation that differs from the actual one by having something else as its subject matter, and if it is correct to say "[it] is burning" in the context centered on that situation.[22]

For *restricted* quantifiers, it is tempting to compose the instruction a_{subj} (ie *change the subject matter*) with the instruction to test the new subject matter for the description from the restrictive clause. So, for example, 'Some potato is burning' would get translated by $<a_{subj};¿p_{potato}?>p_{burning}$.

Since this paper is not directly concerned with quantifiers, and since quantifiers bring along many problems of their own, I will not discuss them any further. Let me stress, however, that for every thematic role (that is, for every argument associated with the predicate that we would use in a language with variables), we would have to introduce in **U** a distinguished instruction (such as

[22] The account outlined here comes already equipped with means of handling the well-known problem of contextual domain restriction. That is, if I say "something is burning," I will probably be talking of some contextually relevant set of things, rather than of everything there is in the universe, and my utterance will be true only if there is something burning within that contextually restricted domain. In contextual update semantics, the domain restriction is handled by the accessibility relations that are already in place, so that when you shift to a situation with a new subject matter, there is no reason to suppose that every possible situation should be in the range of R_{subj}-accessible situations.

'a_{agent}', '$a_{patient}$', etc.). For example, the sentence 'Ali loves Bharati' would be tentatively translated as follows: $<a_{agent}\textbf{;¿}p_{Ali}\textbf{?}><a_{patient}\textbf{;¿}p_{Bharati}\textbf{?}>p_{loves}$. This sentence would be true at a given context if you can move to an 'agent'-accessible situation that satisfies p_{Ali}, and then to a 'patient'-accessible situation that satisfies $p_{Bharati}$, so that the situation shifted to satisfied p_{loves}. Of course, the proposal is very sketchy at this point. Likewise, the extension of the present framework beyond monadic predicates is a potential source of non-trivial complications that I fully acknowledge. However, I am confident that it does not threaten the enterprise of the present framework.[23]

§3.4.1. The notion of subject matter is a *heuristic* notion

One might object that by talking of the subject matter of a situation, I have to be assuming that situations have a certain structure, which is at odds with what I was previously saying, and perhaps with taking situations for primitives from a formal point of view. But to that I would reply that the notion of subject matter may again be traced back to the various relations that situations bear to one another. In particular, it makes sense to talk of an equivalence relation that divides situations into classes whose members are all about the same thing. Two situations can be related by having something in common, for instance, by being both about Bharati, the same way as they can be related by having their location in common, like any two situations that took place on the Main Quad at Stanford. To be sure, I am not saying that the notion of subject matter is self-evident or unproblematic. For instance, my utterances of “he is tall” and “he is honest” made in situations in which I am clearly talking of Ali are both about Ali, so in that sense, Ali is their subject matter. But in another sense, one utterance is about Ali's physical appearance while the other is about Ali's character, and it seems perfectly possible to reclassify those situations as having different albeit related subject matters, namely, Ali's physics vs. Ali's character. The advantage of the formal framework adopted here is that it does not have to decide upon those issues. There are lots of situations and lots of relations among those situations. The study of those relations and the question of which of them are deployed by which words or constructions are

[23] This “confidence” partly comes from the existing results regarding modal systems with the same expressive power as 1st order logic. See eg Kuhn (79).

empirical matters. On a first approximation, we are inclined to classify situations according to what they are about, and we find a correlation with utterances of sentences whose (grammatical) subjects help the interpreter in identifying that thing. But this intuitive notion of aboutness is difficult to pin down, and often, it makes sense to say that two situations are about the same thing in one respect and about different things in some other respect.

In sum, my talk of subject matter is heuristic and, I insist, non-committal. So once again, I am not trying to settle the issue of whether the structure of situations comes first, and we derive from it various relations among situations, or whether situations *are* primitive entities variously related to one another, and we derive their structure from those relations. The latter is the approach that I endorse, and I have simply tried to explain how it works.

§ 4. How It Works in Basic Cases

§4.1. How it works for direct reference

Before we turn to indexicals, even in simple, unembedded sentences, let us first see how this account works for direct reference – the one not mediated by linguistic expressions. Suppose that I have just tasted a chocolate cake and I say to you:

(1) Delicious!

While uttering (1), I am also referring to the cake and saying of it that it is delicious. My utterance is made in some context c, centered on some situation s whose subject matter is the chocolate cake and in which let us assume that the cake is delicious.[24] Being the speaker, I do not have uncertainties regarding the question of what is the "right" context. That is to say, I do not have doxastic or epistemic alternatives for s, simplifying somewhat.[25]

To get a better idea of how this works, let us consider three cases.

§4.1.1. Case 1: no uncertainty

As my interlocutor, having just seen that I have tasted the cake, you have no uncertaintes as to what is the right context. You know that it is centered on the situation currently taking place, whose subject matter is the chocolate cake. However, you cannot decide between s, in which the cake is delicious, and s^+, in which it is not. Then, if c is of the form $\langle \Sigma, s \rangle$, and if p is the atom that translates 'delicious', the truth conditions for (1) will be: $\langle \Sigma, s \rangle \models p$ iff $s \in \Im_P^{\Sigma}(p)$. Put more intuitively, (1) is true if and only if the situation that (1) is about, here the situation in which (1) is

[24] This paper is not directly concerned with expressions of personal taste, such as 'delicious'. For this reason, I will continue to write as if it were a matter of fact whether something is delicious simpliciter. Of course, I am aware that what is delicious to you might not be delicious to me and vice versa. But at this point, it would be a needless complication to pay attention to this additional parameter.

[25] Of course, there will be lots and lots of situations that are my epistemic alternatives for s. For example, if I know that it is around noon without knowing the exact time, I will not distinguish among s, in which it is quarter to noon, s_1, where it is noon, s_2, where it is 11.57, s_3, where it is 12.07, etcetera. But what matters is that all of those situations epistemically indistinguishable from s have the same subject matter, and that subject matter is the cake that I have just tasted and to which I am referring.

uttered, is one in which it is correct to say "delicious." So, given that (1) is about situation s, and that s is about the chocolate cake, (1) is true if and only if the cake is delicious in s.[26] Thus, after you interpret (1), supposing that you assent to its truth, you can reduce your uncertainties by eliminating situation s^+, since $s^+ \notin V^{\Sigma}(p)$.

§4.1.2. Case 2: uncertainty dispelled through update, using background knowledge

Suppose now that before you even start processing my utterance, you have some uncertainties as to what is the right context. You are not sure if it is centered on a situation that has the cake as its subject matter, s, or a situation that has myself as its subject matter, s', or a situation whose subject matter is the fancy silverware that we are using, s". In addition, you have, as before, uncertainties between s, in which the cake is delicious, and s^+, in which it is not. Note that you do not have uncertainties of the same sort with respect to s' and s". Since neither I nor the silverware would normally qualify for deliciousness, we can be sure to have $s' \notin V^{\Sigma}(p)$ and $s'' \notin V^{\Sigma}(p)$. So, if the common ground includes s' and s", then an update with 'p' will have as a consequence that both s' and s" will get eliminated.[27]

Let us suppose that c is again of the form $\langle \Sigma, s \rangle$. As before, the truth conditions for (1) are: $\langle \Sigma, s \rangle \models p$ iff $s \in V^{\Sigma}(p)$. Thus, after you have interpreted (1), that is, after updating your information set with 'p', you can not only update your information set by dropping situation s^+, but also resolve your uncertainty as to what is the right context, because $s' \notin V^{\Sigma}(p)$ and $s'' \notin V^{\Sigma}(p)$. And if I were to

[26] In other words, there is more than one way of specifying the truth conditions of an utterance. You may specify them as conditions on the situation and, more generally, on the context in which the utterance was made. But if you take for granted certain facts about that situation (eg the fact that I, who made the utterance, was referring to that cake), then you can specify the truth conditions of the utterance as conditions on other things suitably related to the situation (like the cake in our case). This point has been emphasized by Perry (01), who distinguishes "reflexive" truth conditions from "incremental" truth conditions. Perry's idea is, roughly, that incremental truth conditions are obtained from reflexive truth conditions by building in various assumptions about the utterance (eg who the speaker is, when the utterance is made, etc). In general, there will be many different incremental truth conditions, depending on which properties of the utterance we keep fixed. I follow Perry in this general idea, though I see the incremental truth conditions as parasitic on the "reflexive" ones, and more importantly, my semantic account does not appeal to any incremental truth conditions at any stage of the analysis. This is in strong opposition to the Kaplanian view, which views a certain sort of incremental truth conditions as truth conditions *par excellence*, and puts those at the center of his account of indexicals and modalities.

[27] Note, though, that your uncertainty as to whether the cake is delicious or not generates new uncertainies with respect to s' and s", since you cannot decide between a situation whose subject matter is myself and relative to which the cake is delicious, and the one whose subject matter is still myself, but the cake is not delicious. And similarly for s".

ask "Could I take some home?," you would immediately understand that I want to take home some of that delicious cake, not some of your silverware.

§4.1.3. Case 3: uncertainty remains, resulting in communication failure

Suppose that you have again uncertainties as to what is the right context. But now, you do not even know if I have tasted the cake, and you cannot decide among situation s that has the cake as its subject matter, situation s° whose subject matter is the wine that we are drinking, and situation s°° whose subject matter is the apple pie sitting in the middle of the table. Furthermore, for each of those items, you have uncertainties as to whether or not it is delicious.[28]

As before, the truth conditions for (1) are: $\langle \Sigma, s \rangle \models p$ iff $s \in V^{\Sigma}(p)$. But now, even after you have interpreted and assented to (1), there is only a minor update that you can make. You will know that there is something to which I have referred, and that it is delicious, but you will not know what that thing is. And if I asked "Could I take some home?," you would not know if I am asking to take home cake, wine or apple pie.

§4.2. What is required for direct reference

In the last case, there was a failure in communication because the audience failed to identify the reference. The speaker wanted to communicate something about the cake, and to do so, she referred to it directly. However, the information did not go through, because the speaker did not make sure that her interlocutors figured out what it was to which she was referring.

Though interesting on its own, this last case will also help us better understand what happens in our everyday use of indexicals. Suppose that I have reasons to believe that you do not already know what I am talking about and that you cannot figure it out immediately, without being given some cues. Then before I even try to convey any new information about the thing to which I am referring, I will use the information that (I can reasonably suppose that) you already have about it to help you identify that thing as my intended reference. That is what happens in most cases.

[28] Note that this generates a total of 24 situations in your information set! For, each of those three situations that differ on their subject matter breaks down into eight situations that differ on the question of which items are delicious in them.

There are two types of cases in which that does *not* happen. First, there are cases in which the subject matter of the conversation is already established and will be picked up by default. For instance, if we have been talking for a while about Catherine Deneuve, and I say "She still looks great," then you will immediately know that I am saying of Catherine Deneuve that she still looks great. The pronoun 'she' is semantically idle here. I use it because the syntax of English requires me to use *some* noun phrase. In certain other languages, like Spanish or Japanese, I would not have used any noun phrase at all. Second, there are cases in which there is something *really* salient, all of the conversation participants are currently focused on that thing, and they all know that they are. These cases, too, can be considered as cases in which the subject matter is already established, only it is established by non-linguistic means: perceptual salience, joint attention, etc.

To be sure, there is no sharp criterion to decide whether something is *really* salient or *simply* salient. Salience is both a matter of degree and of perspective. The exclamatory "delicious!" has instances in which the cake is so obviously salient, with everyone munching on it, that it will unmistakably serve as the default reference for any upcoming exclamation. But there are instances of the same example in which the cake competes for salience with other things (people, silverware, apple pies), and in which the speaker must invest extra effort to single out the cake as the intended reference, by gestures or by linguistic means. And even when the cake comes out as the obvious reference, one might still want to use a noun phrase for it, as in '*it* is delicious'. Here again, 'it' has no semantic purpose and works very much like the expletive 'it' in 'it is raining'.

Now that we have set aside those cases in which reference is antecedently secured – by which I mean that there is some *x* such that if the speaker refers directly to *x*, her audience will know that she is referring to *x* before they even begin interpreting her utterance –, let us see what happens in other cases. Suppose that I want to communicate something about *x*. I have some direct cognitive link to *x*, such as a perception or a memory of it, and that link enables me to refer to *x* directly. But to communicate something about *x* to *you*, it is not enough that I should be referring to *x* directly. You, too, must have a direct cognitive link to *x* in order to receive information about *it*.

So I need to help you create such a link, or, if I can reasonably suppose that you already have one, I need to help you activate it and settle on *x* as that about which I am going to tell you something.

If you cannot immediately establish a direct cognitive link to *x*, I would say that you are not getting information *about x*, though you might get other sorts of information – about me, about my utterance, general information that there is something of which I am saying that it is such and such, etc. For example, suppose that I tell you "Ali Maktoub is joining us for dinner," this being the first time that you hear the name 'Ali Maktoub'. The information that your are able to draw is not *about* Ali, to the effect that he is joining us for dinner. You might draw the information about my use of the name 'Ali Maktoub', to the effect that it has a bearer who will be joining us for dinner. Later, when you get to meet Ali, you will be able to retrieve the information that you have about the name and its as-of-then unidentified bearer, and to turn it into information that is now about Ali himself. This is, roughly, the picture that I am offering.

My account of proper names is, then, very opposed to the theories of direct reference, which roughly hold that through the chain of uses of a proper name, one gets to have information that bears directly on the individual who is at the origin of those uses.[29] To begin with, the semantics that I offer for proper names is very different from that offered by Kaplanian semantics.[30] While the latter holds that the semantic contribution of the proper name 'Ali' is Ali himself, I hold that it is a descriptive constraint on the context, namely, that the subject matter should be "an Ali," ie someone or something called 'Ali'.

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[29] The locus classicus is Kripke (80). Admittedly, Kripke talks of rigid designation, not of direct reference, but his proposal ultimately underlies the dominant referentialist view.

[30] Kaplan holds that proper names do not even have linguistic meaning. He takes their "character" to be stable across contexts, so that the name supposedly denotes one and the same individual in every context. This commits him to say that all the people "with the same name," as one would say, actually have different, albeit homophonic names. In other words, there are as many distinct names 'David' as there are Davids. Others (eg Recanati) hold that a proper name like 'David' is linked with the descriptive condition of being the bearer of that name, but this description is truth-conditionally irrelevant. In other words, the name will pick up the only David there is (if any) in the context in which it is used, but then, only this guy gets contributed to the semantic content of the utterance. I, on the other hand, hold that the name contributes to the semantic content the descriptive condition of being called by that name (or, the descriptive constraint on situations to the effect that their subject matter should be called by that name). Since my paper is primarily concerned with indexicals, rather than proper names, I will not further develop the motivations for this "metalinguistic" account. Suffice it to point out that there are many cases that do not fit at all into the referentialist account, and which are best analyzed by viewing any given proper name N as semantically equivalent to the description 'bearer of N'. For empirical evidence, see eg Geurts (97).

Moreover, even though the speaker who uses a proper name will most often directly refer to someone, and will use the name to help her audience figure out whom she is referring to, I hold that there are many cases in which a name is used, yet no direct reference has been made. In terms of Donnellan's referential/attributive distinction, it is as though the name had been used attributively, in order to talk about whoever happens to be called by that name. The previous example brings out the point. Being acquainted with Ali, I can say "Ali Maktoub is joining us for dinner" while simultaneously referring to Ali, which is what I would typically do if I wanted to convey to you information about Ali. I would then use his name merely to help you identify him as my intended reference. But if I believe that you know nothing about Ali, except that he must be the person for whom I am using this name, then there is no point for me to be directly referring to Ali when I tell you "Ali Maktoub is joining us for dinner."

One might think that we are cognitively wired in such a way that whenever we have a direct cognitive link to something, we will refer to it directly, whether or not we want to. But that form of direct reference is not the one that matters for communication. People communicate to exchange information on something, and this can only happen if both the hearer and the speaker have a direct cognitive access to the thing at stake. If you have hardly any idea who or what Ali is, the information that I can reasonably intend to communicate is that there is someone called 'Ali Maktoub' and that he or she is joining us for dinner. I cannot reasonably expect you to come to believe *of* Ali that he is joining us for dinner.

Let me close this subsection by acknowledging the controversy that lingers on the question of what is necessary and sufficient for direct reference. I certainly do not purport to be settling the debate in this little excursion into the topic. I have merely stated my position, and even that, I have done in very rough lines. I have been talking of *direct* cognitive links, but of course, some links may be more direct than others, and it is utterly difficult, if not impossible, to decide from which point on a link counts as "direct." Eventually, it might turn out that the question of whether direct reference has been made on a particular occasion is a largely contextual matter. Be this as it may, my point times and again is that the (correct) use of an indexical or a proper name does not

warrant direct reference. So let us now turn back to indexicals, and see how they interact with direct reference.

§4.3. How it works for indexicals in the basic case

We normally use indexicals when our interlocutors already have a direct cognitive link to whatever we are referring to or can easily establish one. Consider again the scenario of Case 3 of our example. There are three things to which you are directly related by perception and all of which are equally salient to you, namely, the cake, the wine, and the apple pie, so each of them is a potential subject matter for my utterance. However, I, *qua* speaker, am aware that none of these things is so strikingly salient as to be immediately picked up as my intended reference. Now, I use my own perception of the cake to refer to it directly. I can also see that you are attending to the cake, so I do not need to help you directly relate to the cake. I only need to help you eliminate all the other things to which you are directly related – the wine, the apple pie, yourself, myself... – as not being the subject matter of what I am about to tell you. To do that, sure, I can gesture at the cake or raise it right in front of your eyes, but I also have various linguistic means at my disposal. I can say:

(2) The cake is delicious.

Or I can say:

(3) This is delicious.

Or I can say:

(4) This cake is delicious.

In the three utterances, the noun phrases 'the cake', 'this' and 'this cake' have the same sort of semantic function. They exploit various facts about the cake (and facts about the situation of my utterance) to make it easier for you to latch onto the cake and identify it as my intended reference. The definite description in (2) exploits the fact that it is a cake. The demonstrative pronoun 'this' in (3) exploits the fact that it is salient and proximal to me, ie to the speaker. The complex demonstrative in (4) exploits both facts. Furthermore, neither fact is true of any of the other items

that, for all that you know, could have been the subject matter, like the wine or the apple pie. These are not cakes, nor are they proximal to me. That is how, after interpreting the noun phrase, you are able to eliminate certain situations from your information set. You will eliminate situations that fail to meet the descriptive conditions encoded in the noun phrase: situations in which the subject matter is not a cake, as in (2) and (4), or situations in which the subject matter is not "a this," that is to say, is not salient and proximal to the speaker, as in (3) and (4). Hence, after interpreting the noun phrase, you will be left with one type of situation, whose subject matter is that cake to which I am referring, and it is with respect to situations of that type that you will interpret 'delicious'. Finally, if you are not sure whether the cake is delicious or not, the final upshot of my utterance, supposing that you assent to its truth, is to lead you to eliminate from your information set the situation in which the cake is not delicious.

Turning now to the formal aspect of my proposal, let us concentrate on (3), in which we have an occurrence of the bare demonstrative 'this'. As noted earlier, there is a propositional atom p_{this} that corresponds to the word 'this'. Intuitively, situation s makes that atom true – ie $s \in V^{\Sigma}(p_{this})$ – whenever the subject matter of s is salient and proximal to the speaker in s, whoever it happens to be. Then there is a propositional atom p_{del} that corresponds to the word 'delicious'. Finally, the sentence that translates 'this is delicious' in the formal language is:

(a) $<\!\textbf{¿}p_{this}\textbf{?}\!>p_{del}$

Applying the definitions from §3.3, here are the truth conditions that we obtain for (a):

$\langle \Sigma, s\rangle \models <\!\textbf{¿}p_{this}\textbf{?}\!>p_{del}$

iff there is a context $\langle \Sigma', s'\rangle$ such that $\langle \Sigma, s\rangle R(\textbf{¿}p_{this}\textbf{?})\langle \Sigma', s'\rangle$ and $\langle \Sigma', s'\rangle \models p_{del}$

iff $\langle \Sigma', s\rangle \models p_{del}$, where $S'=\{x \in S \mid \text{if } (s,x) \in \Im(cg) \text{ then } \langle \Sigma, x\rangle \models p_{this}\}$.

Let me decipher this. Consider some context $\langle \Sigma, s\rangle$. In other words, s is the situation that my utterance is about, and here, s is also the situation in which my utterance was made.[31] Suppose that in s, the subject matter is the cake, and it is salient and proximal to me and delicious, and

[31] Note that an utterance can be about a situation different from the situation in which it was actually made.

there are no other cakes and no other proximal things as salient as this cake. Next, suppose that I, as the speaker of (3), know that s is the right situation. That is to say, from my point of view, there are no situations epistemically indistinguishable from s. You, on the other hand, do not know what the right situation is. There are situations that you cannot distinguish from s, like, s_1, whose subject matter is the wine, or s_2, which is about the apple pie. Since you, my interlocutor, cannot distinguish among them, those three situations will be interaccessible via $\Im(cg)$, the common ground relation. In other words, it is *not* common knowledge among us, *qua* conversation participants, that s is the right situation. Then, the job of test **¿**p_{this}**?** is to narrow down our common ground to those situations alone that fall in the interpretation of p_{this}. In particular, s_1 and s_2 are both eliminated, so that our common ground now contains, beside s, only situation s^+, whose subject matter is salient and proximal but not delicious.[32] And once the common ground has been narrowed down to s and s^+ as a result of applying test **¿**p_{this}**?**, the interpretation of the rest of the sentence, assuming that you assent to its truth, will lead you to update with p_{this}. Thus, the final result of interpreting (3), ie of processing sentence (a) in the context described, is to eliminate every situation except s from your information set.

To sum up, sentence (a) is true in context $\langle \Sigma, s \rangle$ if one can narrow down the common ground of $\langle \Sigma, s \rangle$ to the situations that belong to $V^{\Sigma}(p_{this})$ thereby obtaining context $\langle \Sigma', s \rangle$ in which p_{del} holds. Note that (a) will be true in $\langle \Sigma, s \rangle$ only if s itself already belongs to $V^{\Sigma}(p_{this})$. For, if s were not among the situations of Σ', then $\langle \Sigma', s \rangle$ would not even qualify as a context.

[32] Again, I can distinguish between s and s^+ because, *ex hypothesi*, I know that the cake is delicious, but you cannot, because you do not know yet that the cake is delicious. That is why we initially have both situations in our common ground.

§ 5. How It Works for Embedded Indexicals

In this section, I want to give you an idea of how my formal account handles indexicals that lie embedded within doxastic or similar operators. Consider the demonstrative 'this' as used in a belief report:

(1) Bharati thinks that this is impressive.

Suppose that I have uttered (1) in reference to a certain portrait, say *Mona Lisa*, in a situation with some less salient sculpture in the background, say the statue of *Nike*. How is (1) translated into L, the language of contextual update semantics? Again, 'this' gets translated by a propositional atom, p_{this}, and 'impressive', by atom p_{imp}. The translation of 'Bharati thinks that' involves the instruction to shift the context by adjusting it to Bharati's picture of the world. Let $a\text{-}_{Bharati}$ stand for that instruction, which will the relation that relates situation s to situation s' whenever s' is one of Bharati's doxastic alternatives for s. The translation of the phrase 'Bharati thinks that' is, then, the dynamic modality $\mathbf{[}a\text{-}_{Bharati}\mathbf{]}$, which roughly says, "move to any $a\text{-}_{Bharati}$-accessible situation." Finally, the noun phrase 'this' (as opposed to the mere word 'this') is also translated by a dynamic modality, but now, by the existential modality $\mathbf{<¿}p_{this}\mathbf{?>}$, which invites you to test every candidate situation and check that its subject matter is "a this," ie something salient and proximal to the speaker.

This still leaves us with two candidate translations, which correspond to two possible patterns for processing my utterance of (1), and these are $\mathbf{[}a\text{-}_{Bharati}\mathbf{]<¿}p_{this}\mathbf{?>}p_{imp}$ and $\mathbf{<¿}p_{this}\mathbf{?>[}a\text{-}_{Bharati}\mathbf{]}p_{imp}$. Even though the former is closer to the surface syntax of the sentence uttered, we are going to assume that it will be outweighted by the latter. This assumption, provisory at this stage, will be thoroughly discussed and justified in the next section.

For the sake of clarity, let us give ourselves some particular structure Σ, which is as follows:

$S := \{s_1, s_2, t_1, u_1, u_2, u_3, u_4, u_5, u_6, u_7, u_8\}$

$\Im_p(p_{imp}) := \{u_1, u_2\}$

$\Im_p(p_{this}) := \{s_1, s_2, u_1, u_3, u_5, u_7\}$

Among shift-instructions, other than $a\text{-}_{Bharati}$, which stands for shifting to one among Bharati's doxastic alternatives, we also have the interpreter's epistemic indistinguishability instruction and the corresponding relation, represented by the interrupted line. The relation that interprets $a\text{-}_{Bharati}$ will be represented by arrows. The schema is easier to visualize if we leave out the reflexive loops of those relations.

Here is, then, what the initial context looks like, with the designated situation encircled:

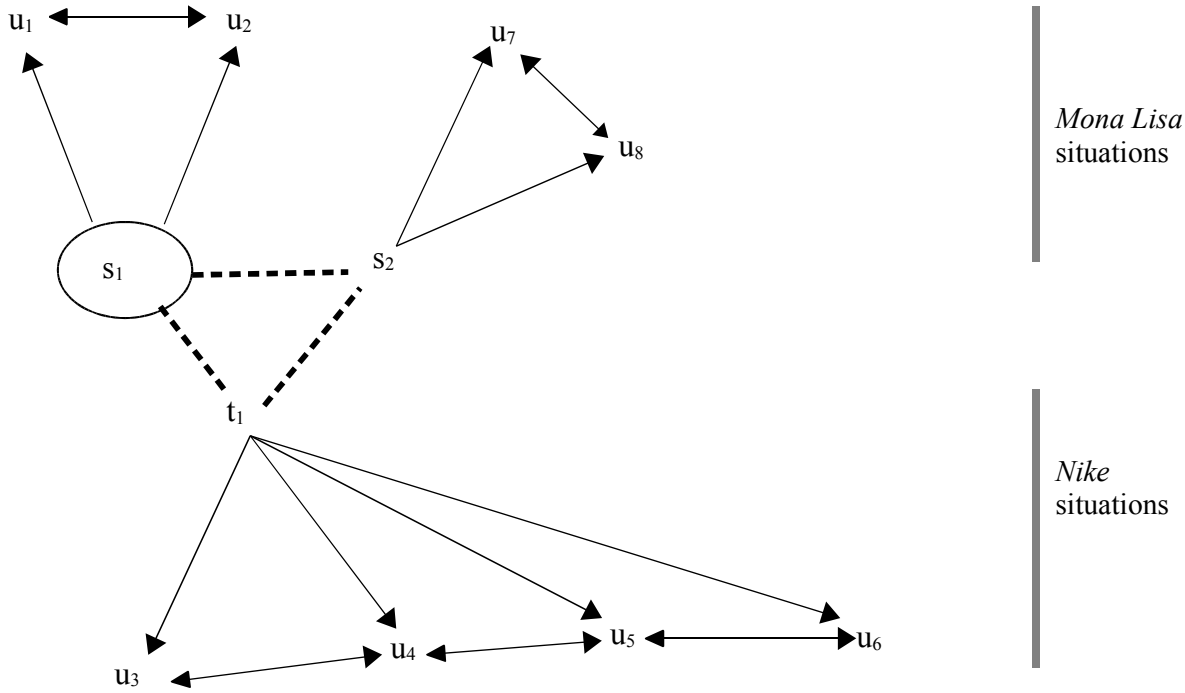

figure 1: $\langle \Sigma, s_1 \rangle$

In English, we would describe structure Σ as follows. The two 's'-situations as well as u_1 and u_2 and u_7 and u_8 are about *Mona Lisa*'s portrait, while all the other situations are about *Nike*'s statue. I know that *Mona Lisa* is the subject matter of my assertion, but you do not know it yet, which explains your indistinguishability relation between s_1 and t_1, on the one hand, and between s_2 and

t_1, on the other. Your indistinguishability relation between s_1 and s_2 means here that you do not know whether Bharati thinks that *Mona Lisa* is impressive (while I do).

Next, both you and I know that only *Mona Lisa* is salient and proximal to me, hence that only the portrait can be correctly referred to as "this," hence that only *Mona Lisa* situations belong to $V(p_{this})$. By contrast, Bharati has no beliefs on that. And intuitively, that is what we would expect, if Bharati is not talking part to our conversation. So for her, if the portrait is the subject matter, it may be "a this" (u_1 and u_7) though it need not (u_2 and u_8); and if the statue is the subject matter, again, it may be "a this" (u_3 and u_5), though it need not (u_4 and u_6). Now, all of Bharati's doxastic alternatives for s_1 are situations in which one may truly utter "impressive!" That is to say, in those worlds *Mona Lisa* is impressive, since both u_1 and u_2 belong to $V(p_{imp})$.[33] On the other hand, in all of Bharati's doxastic alternatives for s_2 it would be incorrect to utter "impressive!" That is to say, in those worlds, *Mona Lisa* is not impressive, since neither u_7 nor u_8 belong to $V(p_{imp})$. Finally, Bharati neither believes nor disbelieves that *Nike*'s statue is impressive, since u_3 and u_4 belong to $V(p_{imp})$, but u_5 and u_6 do not.

Note that when we shift the context by performing instruction $a\text{-}_{Bharati}$, certainly, we adjust the actual situation to Bharati's picture of the world, but we make only minimal adjustments, without changing things at wish. Thus, if *Mona Lisa* is what a given situation is about, then it will also be what the situation to which we will have shifted is about.

Let us now see what happens when we process $\mathbf{<¿}p_{this}\mathbf{?>[}a\text{-}_{Bharati}\mathbf{]}p_{imp}$. As noted earlier, tests are functional updates. Here is, then, the only context related to our initial context $\langle \Sigma, s_1 \rangle$ by $\mathbf{¿}p_{this}\mathbf{?}$:

[33] If we wanted to make the structure more complete, we would need to "multiply" situations u_1 and u_2 as follows: there would be u_{1a} such that if you were to shift from it to another situation by changing the subject matter to the sculpture, you would end up in a situation like u_3 or u_4, in which the sculpture is impressive; and then there would be u_{1b} such that if you were to shift from it to another situation by changing the subject matter to the sculpture, you would end up in a situation like u_5 or u_6, in which the sculpture is not impressive. And we would analogously have u_{2a} and u_{2b}. In other words, u_1 as such does not settle the issue of whether the sculpture is impressive, nor does u_2.

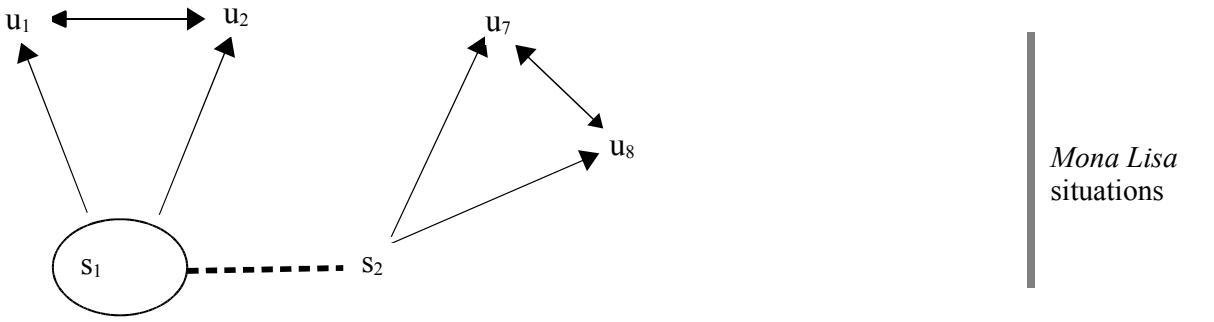

figure 2: the result of updating $\langle \Sigma, s_1 \rangle$ with ¿p_{this}?

By interpreting **<¿p_{this}?>,** you have resolved your uncertainty as to what is the actual situation. Knowing that only *Mona Lisa* is "a this," you now know that this portrait is what I am talking about, and not *Nike*'s statue. You have figured out that the portrait is what I am saying that Bharati thinks is impressive.[34]

Let us now process $[a\text{-}_{Bharati}]p_{imp}$ in the only context related to $\langle \Sigma, s_1 \rangle$ by the test ¿p_{this}?, given in figure 2. This means that we need to look at the truth values that p_{imp} has in $R(a\text{-}_{Bharati})$-accessible contexts. If p_{imp} ever has the value 'false', then $[a\text{-}_{Bharati}]p_{imp}$ itself will be false; otherwise, it will be true. In our example, p_{imp} *is* true in all the situations $R(a\text{-}_{Bharati})$-related to situation s_1, so that we have $\langle \Sigma\lceil p_{this}, s_1 \rangle| = [a\text{-}_{Bharati}]p_{imp}$. On the other hand, p_{imp} is false in the situations $R(a\text{-}_{Bharati})$-related to s_2. So, if you use $[a\text{-}_{Bharati}]p_{imp}$ now as a test to update the context $\langle \Sigma\lceil p_{this}, s_1 \rangle$, ie the context obtained by updating the initial context $\langle \Sigma, s_1 \rangle$ with ¿p_{this}?, you will be led to eliminate s_2, for this situation falsifies $[a\text{-}_{Bharati}]p_{imp}$. Here is, then, the context obtained after this second update:

[34] Note that we have not blindly eliminated all the situations that do not belong to $\Im_P(p_{this})$. For example, we still have u_2 and u_8 because it is still possible, for all that Bharati knows, that the subject matter of my utterance is not "a this." But for you (and for me, of course), that can no longer be possible after the demonstrative 'this' has been interpreted.

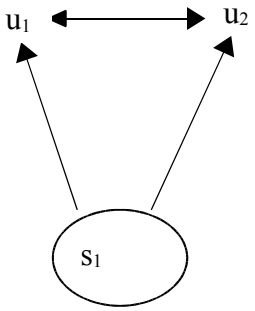

figure 3: the result of updating $\langle \Sigma\lceil p_{this}, s_1\rangle$ with ¿[a-$_{Bharati}$]p_{imp}?

In sum, by putting the semantics from §3.3 into work on this particular example, we could see how its truth clauses can be used to establish that $\langle \Sigma, s_1\rangle|=$**<¿**$p_{this}$**?>[**a-$_{Bharati}$**]**$p_{imp}$. In addition, we also saw how the utterance of (1) as a whole acts as an update on the initial context $\langle \Sigma, s_1\rangle$.[35]

§5.0.1. Who's to choose?

We may now address the question raised at the end of §2, of what it means to shift the context when the update instruction is not functional. Consider the relation that holds among the doxastic alternatives of an agent, such as *R*(a-$_{Bharati}$). It is generally not the case that given a situation, there is a unique situation that can be said to be Bharati's doxastic alternative for it. Even though we like to say things like "the world according to Bharati," in reality, we do not have *the* world, we have several worlds – so long as there are things on which Bharati has not made up her mind. So suppose that you, *qua* interpreter, are in situation s_1 of our example, and you have been given the instruction to shift the context by adjusting the situation to Bharati's beliefs, as we would put it. There are two situations, u_1 and u_2, both of which are *R*(a-$_{Bharati}$)-accessible from s_1. Will you shift to u_1 or to u_2?

[35]To give one more example, consider the sentence 'Bharati thinks that the statue is impressive.' It is easy to see that it will not allow for a true utterance in any of the contexts available on Σ. Its translation will be: **<¿**p_{statue}**?>[**a-$_{Bharati}$**]**p_{imp}, where atom p_{statue} translates 'statue'. As expected, we have V(p_{statue}):={t_1, u_3, u_4, u_5, u_6}, those being the situations in which it is correct to say, "A statue!" For example, context $\langle \Sigma, t_1\rangle$ will survive the update by **<¿**p_{statue}**?>**, but there are situations *R*(a-$_{Bharati}$)-accessible from t_1 that will falsify p_{imp}, namely u_5 and u_6. And the prediction is welcome, given that Bharati suspends her judgment on the impressiveness of *Nike*'s statue.

This is not at all a technical question concerning the formal framework. Technically, we know what must be the case for the sentence to be true in a context centered on s_1: the sentence that operator **[**a-$_{\text{Bharati}}$**]** embeds must be true in *every* context centered on any situation *R*(a-$_{\text{Bharati}}$)-accessible from s_1. And similarly, if we take an existential operator <a-$_{\text{Bharati}}$>, we know that the whole sentence is true if and only if there is *some* *R*(a-$_{\text{Bharati}}$)-accessible situation such that the embedded sentence is true in the context centered on it. So the question of where we shift is, really, a question about the intuitive payoff of this formal proposal. As such, it can only be given an intuitive answer, and here is my suggestion. Given a non-functional update instruction a, if it occurs within the universal modality, that is, if we are interpreting the operator **[**a**]**, then it is the interpreter who gets to pick out an *R*(a)-accessible situation, and processing resumes in the context centered on that situation. On the other hand, if a occurs within the existential modality, <a>, then the relevant *R*(a)-accessible situation is to be picked out by the speaker.

This suggestion is directly inspired by the game-theoretic approach to the semantics of 1st order quantifiers, which analyzes the interpretation of a sentence as a game between a "verifier" and a "falsifier." The verifier is the one to choose a witness for existential quantifiers, while the falsifier does it for universal quantifiers.[36] The intuition is this. Suppose that I tell you ⌜Everywhere *p*⌝, where *p* is some sentence. If my utterance is true, then you may present me with any place you wish and challenge me to show that in that place, *p* is true. And if you point to me a place where *p* is not true, my utterance cannot be true. On the other hand, if I tell you ⌜Somewhere *p*⌝, I will not bother if you challenge me with some place where *p* is not true, so long as *I* can give you a place where *p is* true.

It goes without saying that this suggestion is only the beginning of an answer. For, it does not say how among all the available situations to which you may choose to shift, you get to actually select *this particular* situation. Then, there is the idea that among the accessible situations, some are "closer" to the actual situation than others. However, I have nothing interesting to say on this

[36] Cf. Hintikka and Sandu (97).

very complex issue, which has been amply discussed elsewhere (eg in the gigantic literature on conditionals).

§5.0.2. Loose ends (to be repaired at some further stage)

I have basically provided the framework's skeleton, without specifying all the conditions required to make this *contextual update semantics* work well in practice. For instance, one would want to be able to account for the validity of the inference from any sentence of the form ⌜At some point in the past, it was the case that at some point in the past, φ⌝ to the sentence of the form ⌜At some point in the past, φ⌝, where sentence φ is in some past tense. But to account for such inferences, we first need to distinguish a particular instruction $a_<$ in update language **U**, which roughly stands for the instruction to move to an earlier situation. Then we need to introduce a semantic constraint that forces $a_<$ to be interpreted by a *transitive* relation. At the end, what translates 'at some point in the past' is the dynamic modality $<a_<>$, and given the assumption of $\Im(a_<)$'s transitivity, we get the following result: for any context μ, if $\mu|=<a_<><a_<>\psi$, then $\mu|=<a_<>\psi$.

Now, there are other important things that we might want to impose on $\Im(a_<)$. In particular, when we move from some situation to another along relation $\Im(a_<)$, the time must change, but other things should remain as much the same as possible. In other words, if we are situated, say, at Stanford, and we move into past, we want to stay at Stanford rather than shift to some other place, say São Paulo. The spatial shift ought to be independently triggered by some spatial expression, like 'somewhere' or 'in São Paulo'.

I am not going to spell out in this paper all the properties that we expect of the relations exploited by the modal, temporal and epistemic expressions of English, as would be the property of transitivity for the temporal relation exploited by tenses. The contextual update semantics presented here builds on modal, temporal and epistemic logics and inherits their insights. For example, the relation of being an epistemic alternative that we use to interpret 'knows' is presumably an equivalence relation, while the relation of being a doxastic alternative, used to interpret 'believes', is presumably Euclidean (that is to say, if s' is your doxastic alternative for s,

and if s" is also your doxastic alternative for s, then for you, s' and s" are doxastic alternatives for each other).

The main reason not to spell out the conditions that we expect to hold of the relations used in interpreting update instructions is to avoid the question of what exactly those conditions are. For example, epistemic indistinguishability relations are usually taken to be reflexive, which means that whenever we assent to the truth of ⌜Bharati knows that p⌝ we ought to assent to the truth of ⌜Bharati knows that she knows that p⌝. But some may find this questionable. At any rate, there is an advantage in leaving underspecified the requirements on particular update instructions – even if an account of those requirements will eventually be needed.

§ 6. The Main Problem: How to Account for the Difference between Indexicals and Definite Descriptions

Since Kripke's *Naming and Necessity*, and then Kaplan's *Demonstratives*, it is widely held that any descriptivist view must be doomed to a failure. Descriptivist views hold that the contribution of proper names and indexicals to the semantic content of an utterance is *descriptive*, hence not essentially different from the contribution of definite descriptions. My view is such a view. I hold that what an indexical contributes to the semantic content is a descriptive condition on the context, associated with the indexical as a matter of lexical knowledge. I also hold that the semantic contribution of a proper name is the condition of being a bearer of that name (or, when seen as a condition on the context, the condition of being about someone who bears that name). Finally, I hold that the semantic contribution of a definite description is the descriptive condition made explicit by the description. So, insofar as their semantics is concerned, indexicals, definite descriptions and proper names are all very much alike – they all impose descriptive conditions on the context. In the typical case, the speaker wants to communicate information on something, so she must make sure that the nucleus of her assertion will be interpreted in a context that is about that thing. She knows that a certain context, whose subject matter is the thing that she wants to talk about, meets the descriptive conditions encoded in a given indexical, proper name or definite description. She believes that her interlocutors know that, too. So she will exploit the factual information that she already shares with her interlocutors in order to provide them with more factual information. That is, roughly, the picture that I am putting forward.

In the picture that I am offering, reference is not only present, but plays an important role. For, ultimately, the truth value of our utterances will depend on the things that we are talking about while making those utterances. However, reference is more of a relation between, on the one

hand, the utterance as a whole, made by a speaker addressing her interlocutor in a particular context and for a particular reason, and, on the other hand, things and individuals referred to. To talk of "the reference" of a given term (as uttered in a given context) is at best a convenient, though misleading way to denote that to which the speaker is referring to and is using the term to help her interlocutor realize that she is referring to that thing. But from the point of view of semantics, the term is descriptive. What it contributes to the truth conditions of the utterance are descriptive conditions. Reference, on the other hand, comes in at the stage of evaluating the utterance for its truth value, but it does not participate into its truth conditions – it is not part of the semantic content.

Now that I have reminded you of the general outline of my admittedly descriptivist view, let me turn to the main objection that the theory of direct reference has made to descriptivism. The objection has to do with the behavior of indexicals and proper names that occur embedded in modal, doxastic and other constructions, which is indeed somewhat different from the behavior of embedded definite descriptions. The challenge is, roughly, to explain how indexicals and definite descriptions get to behave so differently, while having essentially the same semantics. The rest of section §6 goes as follows. I will present the main objection, and clarify the issue that it really raises. Then I will argue that the difference between indexicals and definite descriptions is not to be traced to their semantic content. Rather, it has to do with the patterns of semantic processing that can be affected by the choice of the type of the expression used. The use of an indexical, I will argue, enhances the "wide scope" pattern. The idea that indexicals "take wide scope" is an old idea that has been severely criticized. I want to rehabilitate that old idea and show that, suitably understood, it is an attractive and empirically plausible idea.

§6.1. What goes wrong when you replace the indexical with a definite description

The most important objection against the view that I am defending goes roughly as follows.

The main objection to descriptivism:

> *If the semantic contribution of an indexical comes down to some descriptive condition associated with the indexical, then shouldn't it be possible to replace the indexical with a definite description that makes this condition explicit, without thereby altering the truth value of the utterance? But consider the following pair of sentences:*
>
> (1) He could have been a genius.
>
> (2) The most salient male person could have been a genius.
>
> *Suppose that I utter (1) in reference to Ali, and that he simply could not have been a genius. Then (1) is false. Now consider (2) as uttered in the same context, and suppose that some actual genius could have been most salient in that context (eg I could have been pointing at Albert Einstein, or his photo). Then arguably, (2) is true. So, if (2) is understood in this sense, the two utterances differ in truth value. Therefore, given that (1) and (2) are uttered in the same context, yet differ in truth value, there must be some difference in their semantic content. Since (1) and (2) are substitutional variants derived from one another by substituting 'he' for 'the most salient male person' or vice versa, the difference in their semantic content must be traced to the semantic contributions of the indexical and the definite description.*

There are several worries with this objection. The first has to do with the alleged sameness of the contexts in which (1) and (2) are uttered. It is far from clear that in a context in which I am referring to Ali, I can utter (2) and give it the intended reading, on which it is true if it could have been uttered with respect to some actual genius brought to salience. For I would be referring to Ali, and yet, not saying anything about him, and this would be really odd. Since this is not my major worry, let us assume, for the sake of the objection, that the contexts of (1) and (2) are the same in all relevant respects.

Even on the above assumption, the conclusion that the indexical and the definite description must make different semantic contributions is unwarranted. Here is why. To draw that conclusion, you would need to show that even if you grant that the order of semantic processing of (1) is the

same as that of (2), the truth value need not be the same. However, it is clear that if you process the description 'most salient male person' prior to processing the modal construction 'could have been', you will get the same truth conditions as in the case of (1). Namely, if the most salient person is Ali, and *he* could not have been a genius, then (2), processed on this pattern, is false, just as much as (1). So, if one can independently make sure that the two utterances will be interpreted along the same pattern of semantic processing, then the definite description may be substituted for the indexical and *vice versa*, and the substitution will be *salva veritate*.

The real issue is not that substitution fails *tout court*. Rather, it is that substitution may affect the way in which the utterance is processed. It may affect the order in which various descriptive conditions are interpreted. If the speaker uses an indexical, the interpreter will normally prefer the pattern that gives the indexical "wide scope." That is to say, he will normally start by matching his epistemic alternatives with the descriptive condition associated with the indexical. As I will argue below, this is not an *ad hoc* assumption, but a plausible feature of natural language that has a rational explanation.

Descriptivism is charged with the objection that indexicals and definite descriptions cannot make the same sort of semantic contribution because if they did, then if one replaced the indexical with a definite description that makes explicit the descriptive content implicit in the indexical, that would not impinge on the semantic content of the utterance thus obtained. I agree that the choice of expression (eg indexical vs. definite description) may affect the truth value. However, I claim that this impact on the truth value does not go through the semantic contribution of the expression. Rather, it goes through the preference that the interpreter will give to one pattern of processing over another, and the choice of expression affects those preferences. In particular, indexicals tend to "take wide scope." In fact, *pace* what seems to be a widespread conviction among philosophers (though not as widespread among linguists), definite descriptions also tend to "take wide scope."[37] Only, they exhibit this tendency less than indexicals do. It is easier to give narrow scope to a definite description than to an indexical, but there are also reasons why it is so,

[37] See eg van der Sandt (92). In the more philosophical tradition, Strawson's view relied very much on this point.

as we shall see. At any rate, the point is that those differences in preferred scope patterns should not be confused with the semantic contributions made by the two types of expressions.

§6.2. The main objection, second shot

The claim that indexicals "take wide scope" calls for several qualifications. First of all, if we look back at (1) and (2), from the point of view even of surface syntax, the pronoun 'he' already has wide scope, and so does the definite description 'the most salient male person'. The difference is, then, that in the case of (2), it is possible and even easy to interpret the sentence as if the definite description had been given narrow scope, while in the case of (1), that becomes incredibly difficult, if not impossible. But this suggests that in the case of (1) and (2), the problem is not particularly due to indexicals, but rather to definite descriptions.

How come that definite descriptions violate surface syntax and come to be interpreted with narrow scope? The usual Kripkean-Kaplanian reply, originally due to Russell, is to say that definite descriptions are quantifiers in disguise, and thus may take wide or narrow scope. But even if we accept this reply, we still want to know how the syntactically preferred reading, which gives the definite description wide scope, gets overruled by that other, narrow scope reading. Referentialists about indexicals should not, then, do as if they had no issue at all with the syntax/semantics interface. They do, only they pass the bucket to the linguists, counting on them to account for "ill-behaved" definite descriptions.

Let me leave aside the cases of indexicals that, from the point of view of syntax, already lie outside the scope of modal and other operators, and look at a case where the indexical and the definite description do not have wide scope by default. Consider:

(3) It could have happened that he would have been a genius.

(4) It could have happened that the most salient male person would have been a genius.

These are paraphrases of (1) and (2), although not very natural. Still, if I utter (3) in reference to Ali, who simply could not have happened to be a genius, (3) will be intuitively considered as false, while in a context similar in all relevant respects, (4) will be easily considered as true,

because some actual genius could have been the most salient male in that context. The objection to the descriptivist view is that it should predict that (3) and (4) have the same truth conditions, and therefore fail to account for the difference pointed out.

My reply to the objection is twofold. First, I bite the bullet and endorse the claim that (3) and (4) have the same "truth conditions." That is to say, (4), *qua* sentence, has two readings – one in which the definite description takes narrow scope with respect to the sentential operator 'it could have happened that', and another in which it takes wide scope. I hold that (3), *qua* sentence, also has those two readings. Utterances of the two sentences will have the same truth value in every context in which they get the same reading. In that sense, (3) and (4) have the same truth conditions, the same semantics. Second, I claim to be able to account for the difference between (3) and (4), and for the different behaviors of indexicals and proper names, on the one hand, and definite descriptions, on the other. The choice of an indexical or a proper name over a definite description that encodes roughly the same descriptive conditions will often affect the preferences that the interpreter gives to certain readings over others. The difference between (3) and (4) may be, then, traced down to the difference in the probabilities that the interpreter will opt for this rather than for that reading.

§6.3. What I mean by "scope"

I said that I would defend the idea that indexicals "take wide scope." The idea, as I defend it, amounts to the claim that there are regularities in the patterns of processing that we adopt when faced with utterances containing indexicals. We like to interpret the indexical "first." Not so much in the temporal sense, for the indexical may come relatively late, as in (3), by when the interpretation process will already have set off. But when the semantics of an expression invites us to project ourselves into other, often remote and merely hypothetical situations, as modal expressions do, when we are required to shift the context, we will normally want to discharge the descriptive conditions encoded in the indexical before we do the shifting. This is what I mean when I say that indexicals "take wide scope" and like to be interpreted "first." The idea is not a

stipulation, but the reflection of a regularity observed in the use of language, which may be given a common-sense explanation, which I will outline shortly. Furthermore, I am not claiming that indexicals *always* take wide scope, but that they *generally* do. In §7, I will supply examples of "shifted" indexicals. Still, let me note that there has been a lot of controversy over that issue, and this paper is not directly concerned with that controversy. So even if one is convinced that there are just no shifted indexicals, and that the descriptive conditions associated with any indexical (except those occurring within quotation marks) must be interpreted relative to the context in which the indexical was uttered even then, the view put forward in this paper remains not only a viable alternative to the dominant Kaplanian view, but an alternative that has a lot to go for it.

Let me now turn back to the notion of scope that I am using. It is clearly a semantic notion, rather than syntactic. I am not claiming that there must be some LF-movement of indexicals, my account does not postulate any level of syntactic structure where the indexical "c-commands" the sentential operator, or anything like that. To be sure, by distinguishing a *semantic* notion of scope from the syntactic one, the syntax/semantics interface that underlines my account is somewhat messed up, to put it mildly. I fully acknowledge this problem, and am aware of the importance of the work done at the interface of syntax and semantics. With this warning in mind, I dare to make a few naive remarks. It is plausible to suppose that the semantic processing of an utterance sometimes strays from the "guidelines" provided by the syntax of the sentence uttered. Normally, the semantic pattern along which the utterance is processed and eventually evaluated for its truth value follows the syntactic structure closely. But sometimes, for various reasons, the interpreter may opt for a pattern that does not perfectly mirror the syntax of the sentence. The reasons can be pragmatic, but also properly semantic. What I have in mind is the idea that it may be part of the meaning of an expression to give preference to some patterns of semantic processing, even if they are not the ones dictated by the syntax. If this idea is on the right track, then indexicals exhibit a preference for the wide scope pattern, and this preference will be recorded in their meaning. A competent language user knows the descriptive material associated with the indexical, but she also knows how to use the indexical and along which patterns to process utterances containing it.

And if the indexical occurs in the environment of some modal or doxastic construction, the interpreter will preferably interpret the indexical before interpreting that other construction. Since this preference for the wide scope pattern is part of how we use indexicals, it is tempting to regard it as part of their meaning, too.

In this paper, I have chosen to talk about scope and to use formulas that give indexicals wide scope. A framework that employs scope patterns remains close to the spirit of my non-technical story about indexicals and opaque constructions in natural language. However, let me repeat that this is only *one* among the possible frameworks that can be used to tell the same story. There are may be other frameworks that similarly give indexicals a "descriptivist" semantics, not essentially different from that of definite descriptions, but keep the syntax/semantic interface nice and neat, and those may eventually prove preferable to the contextual update semantics presented here.

§6.4. The main objection, third shot: *That's not the case, though it could have been!*

Indexicals exhibit a peculiar behavior not only *vis à vis* overtly sentential operators, but also *vis à vis* all sorts of constructions that generate opacity. Here, I am adapting to indexicals an example with which Kripke argued against the descriptivist theories of proper names:[38]

(5) He is a genius. – That's not the case, though it could have been.

(6) The most salient male is a genius. – That's not the case, though it could have been.

Arguably, the right hand side of (5) is not made true by the possibility that the speaker could have been pointing at some actual genius. In contrast, the right hand side of (6) is ambiguous, and on one reading, it is made true by that possibility. The upshot of this modified version of the main problem is to show that indexicals cannot be safely replaced by definite descriptions not only in complex sentences that involve embeddings under modal or other operators, but not even in simple, unembedded sentences.

Note that substitution does not fail in the simple sentence itself. The problem arises only if we consider the simple sentence within a broader linguistic context. The sentences that diverge in truth value involve devices of propositional anaphora, namely 'that' in 'that's not true' and 'it' in 'it

[38] Kripke's example was: "Aristotle was fond of dogs. – That's not true, though it might have been" (80, p. 12).

could have been', whose antecedent is the simple sentence. When Kripke presented the argument, he did not seem to be aware of the crucial role of such anaphoric devices. But the point is that propositional anaphora is a phenomenon still under study, and there is no general agreement on how it works. There is a promising approach that suggests that the antecedent sentence must be appropriately restored under the anaphoric pronoun.[39] In other words, (5) would really be some sort of shorthand for the following ultra-explicit dialog:

(7) He is a genius. – It not the case that he is a genius, though it could have been the case that he would have been a genius.

If the right approach to propositional anaphora, and to ellipsis in general, is such a syntactic one, then the problem is immediately resolved by the assumption that indexicals tend to take wide scope, even if the notion of scope is understood as a purely syntactic notion. However, I am not prepared to say that indexicals take wide scope in the sense of syntax (mainly because I cannot provide any syntactic evidence that this is so), nor do I want to assume that ellipsis must be treated syntactically. Instead, the assumption that indexicals take wide scope simply means that indexicals have a peculiar behavior in their interaction with opaque constructions in general, be they the usual sentential operators or other more elaborate constructions involving propositional anaphora.

How peculiar is the behavior of indexicals? Not so peculiar, after all. Definite and indefinite descriptions are also known to be able to leap out of the so-called scope-islands. For instance, I can truly say “Bharati thinks that a friend of mine is a genius” in a case in which Bharati thinks that Ali is a genius, but does not know that he is a friend of mine and even thinks that I have no friend who is a genius. The indefinite description 'a friend of mine' is then evaluated in the situation of utterance and relative to what the speaker and her audience believe to be the case, not in “Bharati's world” and relative to what she believes to be the case. In other words, at the level of semantic analysis, the indefinite description takes wide scope, even though the 'that'-clause in which it occurs is, syntactically, a scope-island.

[39] Cf. Lappin (96).

Definite descriptions exhibit a similar behavior in constructions that involve propositional anaphora. Consider the following variant of our example:

(8) Bharati's fiancé, whoever he is, is a genius. – That's not the case, though it could have been.

What we see in (8) looks very much like a scope ambiguity. The right hand side of (8) is ambiguous between the reading on which (8) is true iff Bharati could have had a fiancé who were a genius, and the reading on which (8) is true iff Bharati's actual fiancé, who is not a genius, could have happened to be one.[40]

So then, the main and perhaps only difference between definite descriptions and indexicals is that what the former do sometimes (in fact, often), the latter do almost always – which is, they want to be interpreted right there on the spot, in the context of utterance, rather than be set aside and get interpreted only in some shifted context, at which one has arrived by interpreting some modal, doxastic or other context-shifting expressions.

§6.5. Why indexicals like to take wide scope: a pragmatic explanation

It has often been said that the semantic contribution of an indexical just cannot consist of the descriptive conditions encoded in its meaning, because those conditions are always evaluated in the context of utterance, never in counter factual situations, even when the indexical is embedded within some modal operator. However, to begin with, it is not even obvious that indexicals (ie words like 'today', 'here', demonstratives, pronouns, etc.) are always evaluated in the context of utterance. But even if we suppose that they are, that does not show anything about their semantic contribution. It only shows that the indexical is evaluated in the actual context of utterance. So the question becomes, why is it evaluated in the actual context? The referentialist story goes roughly as follows. Indexicals are evaluated in the actual context because they are directly referential

[40] My informants did not have problems to get the two readings. Still, if one wanted to enhance the second reading, one could be explicit, for instance, by adding, "Bharati's fiancé has some talent, but he never had discipline and was never able to put his talent to work. If he had been raised differently, he would have been a genius."*En passant*, note that the definite description in (8) is used attributively, not referentially. This means that on the Kaplanian account, the definite description does not contribute its reference to the content of (8). It is not clear how Kaplan could account for the ambiguity of (8) and the availability of the second reading.

expressions, and since directly referential expressions must pick up their reference *directly*, they must pick it up in the actual context.

Although the referentialist reply leaves a lot to be desired, I do not want to challenge it here. I merely want to offer an alternative reply. In rough lines, indexicals are evaluated in the actual context, in which the utterance is made and is being processed, because the semantic patterns that place their interpretation in this context are both optimal and enhanced by linguistic conventions.

In other words, if a pattern gives the indexical wide scope over modal and other operators, it has best chances to win out as the dominant pattern, along which the utterance will be processed. Now, what makes us prefer a certain pattern over others? This question comes very close to the issue of scope disambiguation. That is to say, if a sentence allows for several readings, we want to know what makes it possible for the interpreter to settle on the "right" reading. Although the question properly belongs to psycholinguists, it is at least plausible to suggest that a combination of syntactic, semantic and pragmatic factors makes that possible. The interpreter normally takes syntax for a guide. But sometimes, as happens often with definite descriptions, quantifiers, and almost always with proper names and indexicals, some syntactically embedded elements may be pulled out and interpreted before shifting to a different situation. Why does that happen? Consider the case of indexicals. Typically, the meaning of an indexical involves some relation to an utterance. For example, 'I' bids you to look for someone who has just uttered the word 'I', 'here' bids you to look for some place where the word 'here' has been uttered, and so on. Now suppose that in course of a conversation, you need to interpret an utterance that contains 'I' or 'here'. You have the utterance right there at hand, and you are already directly related to the speaker and the place of utterance. In terms of efficiency, you will be better off if you evaluate the conditions encoded in 'I' and 'here', which involve speakerhood and the property of hosting an utterance of 'here', right there in your present situation, where you already have a speaker, a place, and utterances of 'I' and 'here'. So why would you postpone evaluating this material until you shift to other situations – remote, past situations, hypothetical situations, situations in which there is little reason to believe that any utterance of 'I' or 'here' will have been made, hence in which the

conditions encoded in the indexical are likely to fail? In other words, to explain why indexicals tend to take wide scope, we would simply need to appeal to the fact that, in general, it is optimal to process the descriptive conditions associated with an indexical in the context of its utterance.

§6.5.1. A possible worry with the pragmatic explanation, forestalled

I have suggested that in general, it is most efficient to interpret the indexical in the context of utterance because the descriptive conditions associated with the indexical usually involve relations to utterances and properties easy to test in the context of utterance, such as speakerhood, salience, and so on. But recall (2):

(2) The most salient male person could have been a genius.

How come that here, we are ready to shift to a hypothetical situation first, and only then test the property of being the most salient male person? Isn't salience precisely one of those properties that are easy to check out right there, in the context at hand?

Though this is a legitimate worry, it will easily dispel. In order to get the narrow scope reading for the definite description, we were tacitly assuming that (2) was uttered in a situation in which no male person was particularly salient. So the condition of being about someone who was the most salient male failed when applied to the context of (2), and this is a reason good enough to prefer the other reading. But even if there were some most salient male in that context, say Ali, there is an even better reason to give (2) the narrow scope reading. If the speaker actually wanted to be talking of Ali, and to say that *he* could have been a genius, she could have used the convenient, 3rd person pronoun 'he'. If the speaker chose to use the cumbersome description 'the most salient male person' instead, that must have been for some reason – probably because she wanted to distinguish her assertion from an assertion that would have been about Ali. The interpreter, too, may reason in this way. In other words, by choosing the “marked” description over the “unmarked” pronoun, the speaker signals to the interpreter that the marked, narrow scope reading should be given preference over the default, wide scope reading.

§6.5.2. Analogy with scope-disambiguation for definite descriptions

I do not purport to have provided an empirical account of what happens when we interpret indexicals, but rather, a common-sense explanation that supports the idea that indexical take wide scope. We normally appeal to the same kind of common-sense explanation in resolving other sorts of ambiguities. Suppose that at a casual gathering, there comes a weird-looking man with a tie, and I tell you:

(9) In several meetings I saw the man with a tie.

Then, sure, there will be a dominant reading for (9), on which I am saying of that man over there, with a tie, that I saw *him* in several meetings. This reading is dominant because the property of being a man with a tie can be easily tested right there, in the context in which I uttered (9), since there is this guy with a tie, and we are looking at him, and I see that you see him, and you see that I am looking at him, and you can be pretty sure that I am referring to him. This reading is not only dominant for (9), but probably the only one that will be judged acceptable in the context described. However, compare:

(10) In several meetings I saw the chair with a tie.

Even though (9) and (10) are structurally parallel, (10) has a reading that was not available for (9), the "narrow scope" reading, true if several meetings are such that there was one and only one person who was chair (of that meeting), and I saw him or her with a tie.[41]

§6.5.3. To sum up...

Turning back to indexicals, I have suggested that a similar common-sense explanation may be at the origin of their semantic behavior. However, this pragmatic account might prove insufficient to predict all the available readings, and especially to dismiss all the unavailable readings, on a case to case basis. Nevertheless, what was initially a by-product of the optimization of semantic

[41] It is not hard to think of a background story that would enhance the narrow scope reading even for (9). Suppose that a certain organization, whose members are male and always wear ties, has been sending spies to our meetings. Then (9) will likely mean that in several meetings, there was a (unique) man wearing a tie and I saw him, so I would be saying that it has happened several times that I saw the man who was spying that time at the meeting. Since it need not be the same man for every meeting, it is clear that the definite description has narrow scope with respect to the quantifier 'in several meetings'.

processing, hence explainable by pragmatic factors, might well have become a conventional feature of the language. That is to say, even if, given a particular utterance, there is no obvious reason why the indexical should be given wide scope, the patterns that give indexicals wide scope in analogous constructions are by now so entrenched in our mechanisms of semantic processing that we prefer to give the indexical wide scope as a matter of our linguistic knowledge. We know from our previous linguistic experience that in general, it is optimal to interpret the indexical in the context of utterance, rather than in some shifted context. The suggestion is, then, that it has become part of their meaning that indexicals like to be given wide scope, unless there are strong pragmatic considerations that prompt the interpreter to do otherwise.

To sum up, the idea that indexicals take wide scope has been very much criticized in the past, inheriting the criticisms made against the idea that proper names work like definite descriptions that take wide scope. It is beyond the scope of this paper to challenge those criticisms one by one. I am happy enough to have responded to the most powerful objection, dealt with in this section.

§ 7. Shifted Indexicals

§7.1. Some background on monsters

In the past, there has been some controversy over the question of whether there are "monsters." It originated with Kaplan, who wrote "Operators like 'In some contexts it is true that', which attempt to meddle with character, I call *monsters*. I claim that none can be expressed in English (without sneaking in a quotation device)."[42]

In §2.1, I proposed the following schema for the semantics of sentential operators such as O:

> Oψ is true in context c if and only if ψ is true in DET context(s) c*
> such that Rcc*, where DET is a determiner (such as 'every', 'some',
> 'most', etc.) and R is a relation among contexts.

In this sense, I rejected Kaplan's denial of monsters from the outset. In my framework, every modal, temporal, doxastic or epistemic operator is a Kaplanian "monster." Ordinary quantifiers, too, are monsters.[43] Having clarified this, there is a sense in which Kaplan's claim is compatible with my proposal. But first of all, let me clarify a confusion in current debates over the existence of monsters, possibly due to Kaplan himself.

There is a weak and a strong understanding of Kaplan's claim. On the weak one, monsterhood is a property of expression-*types*. An operator is a monster if, on every occurrence, the whole syntactically embedded sentence is interpreted in a shifted context. In fact, that is pretty much what quotation marks do. And on this weak interpretation, it is very difficult to rebut Kaplan's claim, because every potential monster will look so much like a quotation device that if you were to express it in English, you would seem to be "sneaking in a quotation device."

[42] Kaplan (77), p. 511. The notion of character was introduced by Kaplan to capture the notion of linguistic meaning. Technically, characters map contexts to contents, while contents map circumstances to truth values.

[43] A tension, if not contradiction, in Kaplan's own proposal has passed unnoticed. Kaplan claims that no monster can be expressed in English, but quantifiers *are* monsters in his framework. For, quantifiers operate on assignment functions, and Kaplan wrote "It is natural to treat the assignment of values to free occurrences of variables as simply one more aspect of context" (89, p. 591).

On the strong understanding, monsterhood is a property of *tokens*. An operator is a monster on some occurrence if the syntactically embedded sentence, or a part of it, is interpreted in a shifted context. Whether or not Kaplan had this in mind when he talked of monsters, the question of whether indexicals can be shifted on any occurrence at all seems to be the one that has received most attention.[44]

If we set quotation aside, are there other ways of "shifting" the indexical, so as to interpret the descriptive conditions associated with it in some context other than the context of utterance? Strongly understood, Kaplan claims that there are not. In this section, however, I will look at some cases that suggest to the contrary that indexicals *can* take narrow scope.

§7.2. Are anaphoric pronouns shifted?

The largest class of cases of what I see as indexicals with narrow scope are also the most controversial. Throughout the paper, I have been using personal and demonstrative pronouns in giving paradigm examples of indexicality. These expressions are "indexical" in several respects. Most often, the speaker using them is also referring to something, and is using the pronoun to help her audience figure out what she is referring to. Then, the descriptive conditions associated with them usually involve relations to utterances (eg speakerhood) and "contextual" properties (eg salience). Further, it is usually common knowledge among the speaker and her interlocutors whether or not a given individual, thing or situation meets those descriptive conditions. Finally, pronouns generally take wide scope over operators within which they lie embedded.

But here comes a problem. If we agree that pronouns 'he' and 'she' and demonstratives 'this' and 'that' are indexical, then they will be "shifted" very often, namely, whenever they are used anaphorically or are bound by a quantifier. The general tendency in the literature on indexicals

[44] For instance, Recanati (2000) provides examples of utterances in which the indexical (eg 'tomorrow') is interpreted not with respect to the actual context of utterance, but with respect to some shifted context. Recanati clearly focuses on occurrences of shifted indexicals, rather than expression types that would shift indexicals regularly. On the other hand, Schlenker (2002) provides cases that might qualify as examples of "strong" monsters (thus rejecting the weak interpretation of Kaplan's claim). The evidence provided by Schlenker derives mainly from other languages, such as Amharic, in which the 1st person pronoun 'I' is regularly "shifted" in attitude reports. Anand and Nevins (04) provide further evidence from languages Zazaki and Slave, in which the 1st p. pronoun and, depending on the verb, the 2nd p. pronoun, get regularly shifted.

has been to simply discard bound and anaphoric uses of pronouns and demonstratives.[45] There are some who would say that any expression that can be bound or anaphoric is *ipso facto* not indexical, while others would say that such an expression is indexical only when it is used deictically. Note, though, that this is not just a terminological proposal on the question of what the term 'indexical' should be reserved for. For, it amounts to neglecting something that anyone who is trying to give an account of reference and indexicality ought at least to try to explain. How come that expressions that have been seen for a long time as paradigms of referential expressions, such as demonstratives 'this' and 'that', can actually be used to help identify things unavailable in the context of utterance, things accessible by means of conditions specified in some antecedent expression? To be sure, I did not provide a thorough account of that either. What matters, though, is that the continuity from deictic and anaphoric to bound and attributive uses was part of the background motivations for my account, and not something that I would be happy to set aside if it did not fit my account of indexicals.

Be that as it may, if we set aside quotation devices as well as anaphoric and bound uses of demonstratives, 3rd person pronouns, *here/there*, *now/then*, etc., are there any shifted indexicals left? I want to suggest that there are, though the cases are rather controversial, but that is also to be expected.

§7.3. About the very idea of shifted indexicals

Before examining particular cases in which indexicals appear to be shifted, a general remark is in order. The account that I have proposed does not require that we should be able to use indexicals "with narrow scope," ie in such a way that the descriptive conditions encoded in their meanings get interpreted in some context other than the actual context. However, if we can find cases of shifted indexicals, and this section's aim is to show that we can, that provides additional support to my account.

[45] Cf. Kaplan: "Pronouns are *lexically ambiguous*, having both an anaphoric and a demonstrative use" (1989, p. 572, my emphasis). Many people, including myself, find Kaplan's position difficult to swallow.

One reason why it may not be obvious whether something is a case of a shifted indexical is that it may be not obvious whether the expression counts among indexicals in the first place. There is no well-defined criterion of indexicality generally agreed on. But this should not come as a surprise. Indexicals, I have argued, are not really different from definite descriptions. The differences are only *in degree*. It happens more often to indexicals that their use will coincide with direct reference than it happens to definite descriptions. But even among definite descriptions, we can see that some of them are more likely to be used referentially than others. The richer and more specific the descriptive content of a description is, the easier it will be to use it attributively. Secondly, the descriptive conditions associated with indexicals involve relations to utterances and perceptually verifiable properties of contexts more often than the conditions associated with definite descriptions. Thirdly, it is in general easier to "shift" a definite description, that is, have the associated condition interpreted in a shifted context, than to shift an indexical.

These differences, probably interrelated, only approximate a distinction. To be sure, syntactically, one can tell that something is a definite description if it has been formed using the definite article. But semantically, there does not seem to be a sharp distinction between indexicals and non-indexicals. There is a whole class of expressions, including 3rd person pronouns, demonstratives 'this' and 'that', 'here' and 'there', 'now' and 'then', which, in terms of the three differences outlined, fit somewhere in the middle. For instance, 'this' is *more indexical* than 'that', but it seems pointless to say, without further qualification, that 'this' is an indexical and that 'that' is not, or that both are indexicals, or that neither is. The question of whether there are shifted indexicals makes sense only once we draw a sharp distinction between indexicals and non-indexicals. But it is not clear to me that such a sharp distinction can be drawn, without a fair amount of arbitrariness.

§7.4. *Today, tomorrow, yesterday* in embeddings

Let me begin with a well-known case of shifted temporal adverbs 'today' and 'tomorrow':

(1) Never put off until tomorrow what you can do today.

Kaplan makes note of this example in a footnote, and adds "What should one say about this?"[46] He offers no answer, but the answer seems to me straightforward: in (1), the operator 'never' does "meddle with the character," taking wide scope over 'tomorrow' and 'today'.

It might be that (11) was never taken seriously because of its proverbial look. But even some respectable philosophers have used temporal adverbs with a "shifted" interpretation in mind. My favorite example is a well-known "principle" from Frege's *Der Gedanke*:

(2) If someone wants to say today what he expressed yesterday using the word 'today', he will replace this word with 'yesterday'.

If this principle were understood as being about the day on which Frege wrote it, or even as being about the day on which we read it, it would no longer be a principle. Obviously, the intended interpretation is generic. The principle is meant to apply to *every* day on which someone wants to say something that he said *the day before*. This shows up in how we would report Frege's view. Given that today is February 16, 2005, consider the following options:

(3) Frege held that if someone wanted to say on March 25, 1917 what he had expressed on March 24, 1917 using the word 'today', he would replace this word with 'yesterday'.

(4) Frege held that if someone wanted to say on February 16, 2005 what he had expressed on February 15, 2005 using the word 'today', he would replace this word with 'yesterday'.

(5) Frege held that if someone wanted to say today what he had expressed yesterday using the word 'today', he would replace this word with 'yesterday'.

(6) Frege held that if someone wanted to say what he had expressed the day before using the word 'today', he would replace this word with 'yesterday'.

Reports (3) and (4), though not literally false, are inaccurate. On the other hand, both (3) and (4) are fine. Note that even if we refrain from considering 'today' and 'yesterday' as being shifted in the principle itself, we have good reasons to consider them as being shifted in the *report* of Frege's having held this principle. For, if 'today' and 'yesterday' had wide scope in (5), we would

[46] Kaplan (77), p. 534.

need to explain why (4), obtained by replacing the two indexicals with 'on February 16'/'15, 2005', is no longer an accurate report of what Frege held, even though today *is* February 16, 2005.

Substitution of co-referential terms in reports of propositional attitudes has been one of the problems most discussed in philosophy of language. It is also one of the most threatening problems for the referentialist views. There are several approaches to the problem. There are those who deny that substitution fails, but insist that the use of distinct terms may *convey* distinct things. Then there are those who acknowledge the substitution failure, but insist that reports of attitudes like beliefs will report not only *what* is believed, but also *how* it is believed.[47] It would be too much to say that those approaches do not work, but honestly, they do not work very well. At any rate, another approach is immediately available to descriptivist frameworks such as mine. Namely, if indexicals and proper names do not bring their reference to the semantic content, but bring their descriptive meaning instead, then the use of distinct terms will generate distinct contents.

One might object that even if the two terms encode different descriptive conditions, if those conditions single out the same thing relative to the context of utterance, the way 'today' and 'on February 16, 2005' do in any context in which it is common knowledge that today is February 16, 2005, then although the semantic contents of the utterances are distinct, the truth values should be the same. Yet, the problem of substitution in doxastic constructions is precisely that the truth value gets affected.

Since the pair of (4)-(5) is not the best example, both utterances being true,[48] consider a different case. Suppose that Ali is working on a proposal, for which the deadline is February 17, 2005. He got somewhat mixed up with dates, so he thinks that February 17 is in two days (while it is actually tomorrow). Finally, Ali does not think that he can finish the proposal in one day, but he is quite confident that he can finish it before the deadline, which he thinks is in two days. Now

[47] In the first camp we have (among others) Kripke, Kaplan, Salmon, Soames, Taylor, and in the second camp, Perry, Crimmins, Recanati.
[48] Actually, it is not difficult to describe a context in which (13) or (14) come out true while (15) is false. I leave it as an exercise to the reader.

consider the following utterances that I, knowing all of the above, might make today, on February 16:

(7) Ali believes that he will finish the proposal by tomorrow.

(8) Ali believes that he will finish the proposal by February 17, 2005.

(9) Ali is trying to have it all done by tomorrow.

(10) Ali is trying to have it all done by February 17, 2005.

I do not want to claim that we have clear and robust intuitions on the truth values of these utterances. For one thing, the context that I have described remains under-described. In my own framework, to determine the truth value that the utterance will have, one will need to know what was the "reading" (or the pattern of semantic processing) intended by the speaker, and whether she could reasonably expect her interlocutors to identify the intended reading. But in any case, I do want to claim that *there are contexts* such that the majority of competent English speakers, if they were in such a context, would say that (7) and (9) are false while (8) and (10) are true.[49]

The reading on which (7) and (9) are false, also known as the *de dicto* reading, is, I suggest, a case of a shifted indexical. What happens in the processing of (7) is, roughly, that we first shift the context by interpreting the doxastic operator 'Ali believes that', ie we adjust the context of (7) to Ali's picture of the world. By interpreting 'he', we will have made sure that the doxastic alternative shifted to has Ali himself as its subject matter. It is in this doxastic alternative that the rest, ie 'will finish the proposal by tomorrow', gets interpreted. As usual, the contribution of 'tomorrow' will be the descriptive condition that the day in question (ie the day by which the subject matter, here Ali, will finish the work) should be the day following the day of the situation on which the condition is being tested. Since Ali is not ready to say "I will finish the proposal by tomorrow," the embedded sentence comes out false in the context of Ali's thoughts,[50] and in turn, (7) itself comes out false.

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[49] Of course, there are contexts in which the four utterances will be considered as true by the majority of speakers, and contexts in which the four will be considered as false. And then, there are contexts in which the speaker might intend one reading but fail to make it possible for the interpreter to identify the intended reading, and in which there will be no obvious answer as to what the truth value of the utterance is.

[50] Ie the context centered on the situation accessed as one of Ali's doxastic alternatives for the actual situation, here, for the situation in which (7) is uttered.

Let me point out an interesting feature of my account. Remember that in shifting the context, we make minimal adjustments only, modifying only what the expression under interpretation demands us to modify. This means that Ali's doxastic alternative to which we shift in interpreting (7)-(8) is taking place on the same day as the context from which we shift – here, February 16, 2005, the day when (7) and (8) are uttered. At the same time, it may be said that Ali's doxastic alternative is taking place "on February 15, 2005," because that is what Ali takes today's date to be. In that way, even though 'tomorrow' is shifted, and takes narrow scope with respect to the doxastic operator, the day that it helps to single out from where *we* stand is February 17, *our February 17*, while at the same time, from Ali's standpoint, it will single out *his February 16*.

§7.5. *Today, tomorrow, yesterday* in narratives

While it is admittedly difficult to use an indexical like 'today' in communication and endow it with a "shifted" interpretation, even if the indexical lies embedded within a 'that'-clause, that can happen much more easily in a narrative. Telling the story of an event that happened long ago, the author writes:[51]

(11) A few days later he rang us up and said we should come over sometime, say tomorrow evening, and have a whiskey with him, in very select company of course.

In (11), 'tomorrow' is obviously meant for the day after the day that "he" rang them, rather than for the day after the day on which the story is being told. Now, there has been recently some discussion over indexicals used in free indirect discourse, which is a form of reported speech (sometimes merely *inner* speech) often used in narratives.[52] But interestingly, in (11), the indexical 'tomorrow' is used in ordinary indirect discourse, within the scope of 'said [that]'.

Here is another case of 'tomorrow' shifted in a narrative, again from the story of an event that happened years earlier:[53]

(12) And though we didn't waste a syllable on tomorrow and the alike, a sort of tacit assumption arose, that we'd be able to talk about it the day after tomorrow.

[51] Bertold Brecht, *North Sea Shrimps*, transl. Hugh Rorrison, in Brecht (1998), p. 78.
[52] Cf. Recanati (2000), Schlenker (2003).
[53] Bertold Brecht, *Story on a Ship*, transl. Antony Tatlow, in Brecht (1998), p. 16.

It is remarkable that in that same story, within the span of a page, we find shifted indexicals, as in (12), with the help of which the author refers back to the time of the reported event, but we also find *un*-shifted indexicals, which help referring back to the present time:[54]

(13) One of us now said something which we noted carefully and still recall many years afterwards, and I don't intend to forget it today.

What is also remarkable about (13) is that the indexical 'now' is shifted, being used for *then*, that is, for the time of the event that the author still recalls "many years afterwards," while the indexical 'today' is used for *today*, ie for the day on which the story is being told.

§7.6. Shifting 'I'

I want to end this section by considering whether the 1st person pronoun 'I', which is often seen as an indexical *par excellence*, allows for shifted uses.[55] In the first two subsections, I will look at some cases known from the literature, in which something weird seems to be going on with the way in which 'I' is used, and one way to account for that would be to provide 'I' with a "shifted" interpretation. In the last subsection, I will look at pragmatic considerations that could perhaps explain why it is so difficult to shift the indexical 'I'.

§7.6.1. Nunberg-style examples

Suppose that at a party you tell me some nasty gossips about Bharati. You would feel bad if she learned that you we gossiping about her, but you know that I am not a friend of Bharati, though there are many of her friends around. Let us also suppose that all of this is common knowledge among us. Still, I might say:

(14) Watch what you are saying! I might have been one of Bharati's close friends.

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[54] Ibid., p. 17.

[55] Related to this issue is a well-known example from linguistic literature, Irene Heim's bound use of the 1st p. pronoun in "Only I did my homework." The issue was anticipated by Barbara Partee, who wrote: "There does seem to be the possibility of a bound-variable use of *I*, not with quantified antecedents, but in the formation of relative clauses by predicate abstraction in certain cases where tension between syntactic agreement and semantic interpretation undoubtedly plays a role. Thus ['I am the only one around here who will admit that I could be wrong'] tends to admit a bound variable reading of the second *I*, perhaps even as its preferred reading." (89, fn. 3). Interesting though they may be in their own right, I will set aside such bound uses in my discussion of shifted uses of 'I'.

Intuitively, I am not saying that if things had turned out differently, eg if Bharati and I had lived in the same neighborhood, gone to the same schools, and so on, I might have become her close friend. Rather, I am warning you to be careful because you might have happened to be talking to one of Bharati's actual friends. These two interpretations of the sentence 'I might have been one of Bharati's close friend' might be tentatively captured by giving the indexical 'I' either narrow or wide scope with respect to the modal operator.

This sort of examples were pointed out by Nunberg as a potential problem for referentialist accounts.[56] Recanati responded to Nunberg's challenge by insisting that even in a case like (14), the indexical 'I' is referential. The two interpretations, Recanati suggested, are due to the difference between two types of modality, namely epistemic vs. metaphysical modality. The idea would be, then, that there is an *epistemic* possibility in which I, who am not Bharati's friend, happen to be one. Note, though, that in (14), I am not Bharati's friend in *any* of your epistemic alternatives. But Recanati would presumably say that you might have had, in the metaphysical sense of the phrase, an epistemic alternative in which I were Bharati's friend.

§7.6.2. Talking about cognitive significance

We know since Frege that the choice of an expression over another can affect the cognitive significance of an utterance, even when the two expressions "denote" the same thing. Suppose that you ask me when the deadline for a certain proposal is. If I say "the deadline is today," I will provide you with information that would be provided were I to say instead "the deadline is February 16, 2005," even though today is February 16, 2005. For, if I use the indexical 'today', you will know that the proposal is due by that very day, the day of my utterance, which you will not know if I just tell you the date by when it is due, unless you know what today's date is.

I now want to suggest that in talking about cognitive significance and information, and in using related expressions, we can easily endow indexicals with a shifted interpretation. Suppose that at a party, I have been talking to someone whose name I did not quite get, and I have been

[56] Cf. Nunberg (93), Recanati (93, p. 301). For related discussion, see also Israel and Perry (96).

telling this guy how I admire Pierre Boulez and how I would have loved to meet him. Now the guy says:

(15) Well, then, you'll be glad to learn that I am Pierre Boulez.

It is plausible to view the indexical 'I', and possibly the proper name 'Pierre Boulez' as well, as being "shifted" in (15). For, I will surely be glad to learn that the speaker – my interlocutor – is the person known by the name 'Pierre Boulez'. Whereas if the indexical 'I' as well as the proper name had been given wide scope, they would serve to single out one and the same person, and it is not particularly interesting to learn of that person that he is himself.

To be sure, examples (14) and (15) do not *prove* but merely *suggest* that 'I' can be shifted and take narrow scope. In my own framework, another perhaps more attractive analysis immediately suggests itself for (15). Recall that indexicals work as tests on the context, helping the interpreter narrow down the set of candidate situations and, ideally, to identify the situation that the processed utterance is about. In the context of (15), 'I', modulo the test of speakerhood, will lead the interpreter (me) to single out some situation s_1 whose subject matter is whoever has passed the test, viz. Pierre Boulez. Similarly, the proper name 'Pierre Boulez', modulo the test of being a bearer of that name, will lead me to single out some situation s_2 whose subject matter is a bearer of the name 'Pierre Boulez', the same one that I have been telling my interlocutor how I would love to meet, and this subject matter is again Pierre Boulez. Now, situations s_1 and s_2 are, as it turns out, in the equivalence relation of having the same subject matter. At the same time, from where I epistemically stand (before processing the utterance), there is an open alternative relative to which s_1 and s_2 do not bear to one another this equivalence relation. In interpreting (15), I get to eliminate this epistemic alternative, so that in my updated information set, s_1 and s_2 will always be interaccessible via the relation of sharing the subject matter. Since this is a non-trivial update, I do learn something (namely that $s_1 \sim_{same\_subj} s_2$), which I am indeed glad to learn.

§7.6.3. Why it is so difficult to shift 'I'

Even if it actually turned out that some indexicals, such as 'I', do not allow for shifted uses, that would not threaten my proposal in this paper. All that I would need to say is that in English, the patterns that give the indexical 'I' wide scope are so deeply entrenched in how this indexical is used that, however hard we might try, we will not manage to make the interpreter settle on a narrow scope pattern. And actually, it is not surprising that in the case of 'I', the shifted interpretation is so difficult to come up with. The argument follows.

Let us assume that 'I' encodes the condition of being someone who has just used the word 'I'. Then, a speaker who has just used the word 'I' will obviously meet this condition. Moreover, the interpreter normally knows that the condition is met by the speaker, whom he can hear or see uttering 'I' and identify otherwise than as the person, whoever he or she might be, who has just used the word 'I'. But let us now ask what a shifted use of 'I' would amount to. For one thing, the descriptive condition encoded in the indexical needs to be interpreted in a shifted context, within the scope of an operator. Two things can happen. First, the individual who uniquely meets the condition in the shifted context is the same as he or she who meets the condition in the original context, namely, the speaker. That happened, for instance, in (15). But in that case, the contrast between the wide scope and the narrow scope interpretation almost fades away. It becomes very difficult, then, to argue that the indexical is actually shifted.

Second, the individual who uniquely meets the condition in the shifted context is not the one who meets the condition in the original context. In that case, there is a conflict between using the descriptive condition in 'I' to identify the speaker, who, to everyone's knowledge, meets this condition in the original context, and using it to identify someone in the shifted context. In this conflict, the odds are on the speaker's side. The speaker cannot just cancel out the fact that she has just used the word 'I'. She is already a salient candidate to be picked up as the subject matter, and by using a description that exploits this transparent fact, she will naturally lead the interpreter to

infer that she wants to be talking of herself. Moreover, it is part of the conventions governing the use of 'I' that speakers normally use this pronoun to talk of themselves.

So what, then, can one do to create the conditions in which the interpreter will be naturally led to use the condition encoded in 'I' to identify someone other than the speaker? Even if one can make sure that in the shifted context, there will be someone who would have used 'I', the speaker still needs to downplay the fact that she, too, has used 'I'. In addition, she will need to give her interlocutor a reason to dismiss the generally preferred, wide scope pattern, so as to opt for the more deviant, narrow scope pattern. Usually, one opts for the narrow scope pattern precisely because the wide scope pattern has failed, ie because in the original context either nothing met the descriptive condition or what did was just too unlikely to be the subject matter intended by the speaker. But the descriptive conditions associated with 'I' will always be met in the original context.

In sum, while this leaves open the possibility of having shifted uses of 'I' in English, we have every reason to expect that such uses will be very scarce and deviant-looking.[57]

[57] If this pragmatic explanation is on the right track, it becomes somewhat puzzling how there can be languages that tolerate shifted uses of 'I', as are Amharic, Zazaki and Slave do (cf. Schlenker (03), Anand & Nevins (04)). One could suggest that the meaning of the 1st p. pronoun in English is not quite the same as in those languages – for instance, the descriptive condition encoded in 'I' in a language like Amharic might simply be that of speakerhood, while in English, it would be the richer condition of being someone who has just used the word 'I'. Conversely, one could suggest that the meanings of verbs that report attitudes are not quite the same in the two languages – for instance, the equivalent of 'say [that]' in Amharic might in addition downplay the fact that the reporter is currently speaking, the way quotation does in English. (Thus, if X is directly quoting what Y said, there is the intuition that X herself is not asserting anything, rather, it is Y who is asserting something through X's mouth.) At any rate, it is clear that in the languages that allow for 'I'-shifting, the 1st person pronoun will not pattern in the same way with attitudinal verbs as in English.

§ 8. Conclusion

In this paper, I have put forward a semantic account of indexicals that attempts to capture what is most valuable in the referentialist and the descriptivist intuitions. It has not been my goal here to argue directly against the dominant, Kripkean-Kaplanian view, though I have offered a variety of such arguments elsewhere.[58] My goal has been to submit my positive account as an alternative to that dominant view. There may be a few open ends on the technical side of my account, but at this point, it is the conceptual side that matters most.[*]

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[58] Stojanovic (02), (03); the latter focuses on the notion of *what is said*, and responds to arguments for referentialism based on our intuitions on what is said.

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